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# A MANUAL OF

# PRECIOUS STONES

AND

# ANTIQUE GEMS.

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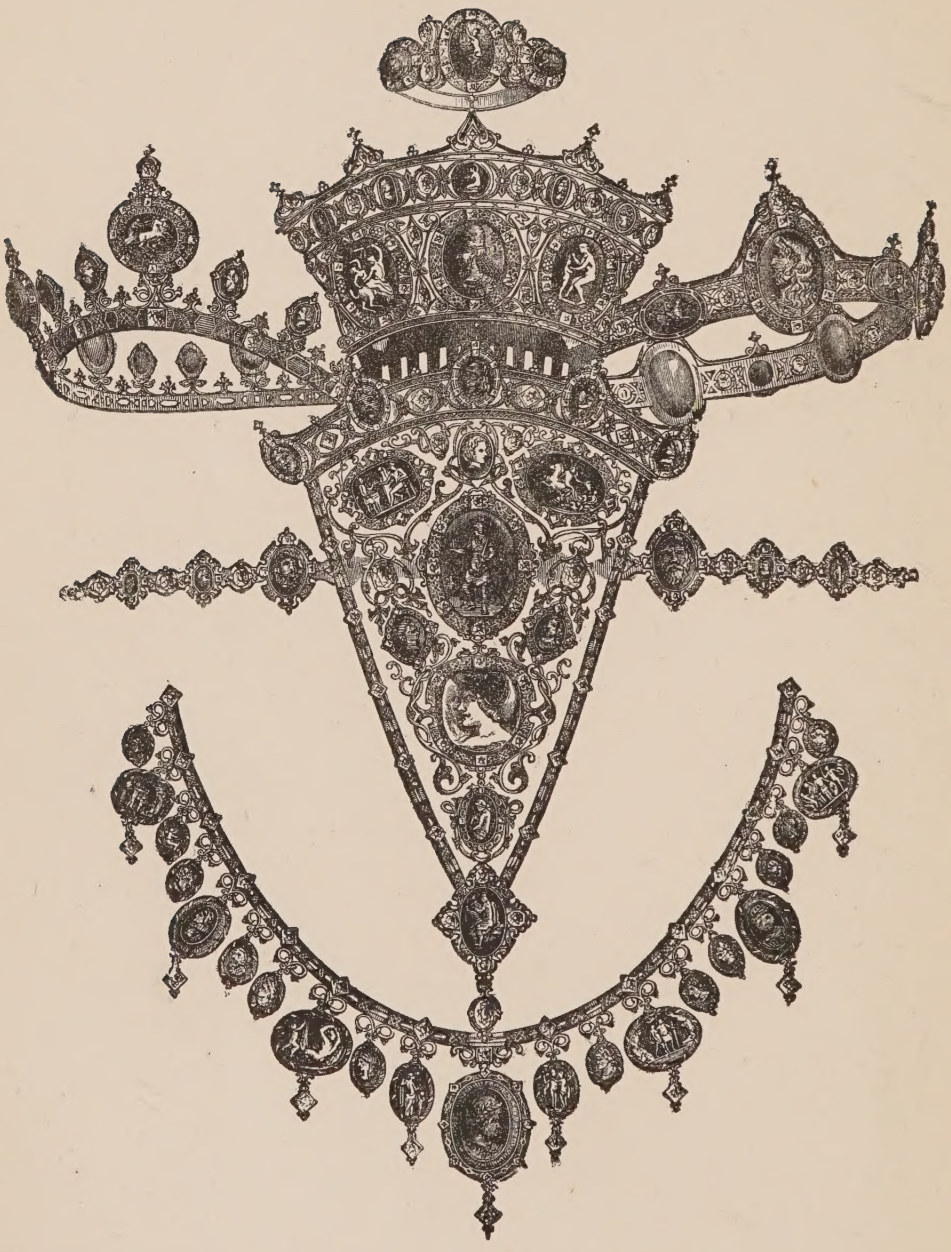

THE DEVONSHIRE GEMS.

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# A MANUAL OF

# PRECIOUS STONES

AND

# ANTIQUE GEMS.

BY

HODDER M. WESTROPP,

AUTHOR OF "HANDBOOK OF ARCHÆOLOGY," "PRE-HISTORIC PHASES."

London:

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# PREFACE.

I HAVE been induced to compile, for the benefit of amateurs and collectors of antique gems, a concise account of precious stones and antique gems; those usually called hard or fine stones, and also of some other stones and substances which cannot be comprised under the head of precious stones, but are frequently used in jewellery, and for ornamental and glyptic purposes.

In this compilation I have frequently adopted the words of the best authorities, Dana, Bristow, Mr. Maskelyne, and others. In the second part I have noticed the principal precious stones, and other substances employed for glyptic purposes, known to the ancients, and described by ancient writers, and have attempted an identification of them with those known to mineralogists of the present day, in which I am much indebted to the writings of Mr. King and Mr. Maskelyne.

In all ages precious stones and engraved gems have been favourites of men of taste, not only for the transcendent beauty of colour and the brilliancy displayed in these stones, but also for the art exhibited in the engravings on them. Even warriors in ancient times testified their admiration of gems and precious stones. Alexander the Great was a

great patron of the glyptic art displayed in them, and such an admirer of gems, that he would allow no artist but Pyrgoteles to engrave his royal countenance, and that only on an emerald. Mithridates was a great gem collector. The gems and precious stones acquired by Pompey's conquest of his dominions were the first that gave the Romans a taste for these precious objects. Julius Cæsar was an enthusiastic collector of gems and other works of art, six cabinets of which he dedicated in the temple of his patron goddess, Venus Victrix. Augustus, Mæcenas, and Hadrian, were also gem collectors: though Mæcenas passionately loved gems, the sight of his emeralds, beryls, and pearls, he declared, could not console him for the departure of Horace. Among the Romans in the time of Pliny there was quite a rage for precious stones and engraved gems, Roman Senators outvying one another in the extravagant prices given for them. Nonius, a Roman Senator, was content to suffer proscription and exile rather than give up to Antonius a priceless opal which he possessed.

In modern times we find the Medici, Frederick the Great, Winkelman, Goethe, Visconti, devoting their attention to this exquisite branch of art.

A century ago men of rank and wealth in this country were vying with each other in collecting antique gems. The Dukes of Marlborough and of Devonshire, the Duke of Montague, the Earls of Carlisle and Besborough, and Lord Algernon Percy, were among the noblemen whom cultivated tastes induced thus to expend wealth on collections of classical and archæological interest. In the last few years a fresh impulse has been given to their study in England by

the publication of Mr. King's works on Precious Stones and Antique Gems, and by the acquisition of a wonderful collection, the Blacas, by the British Museum.

A number of collectors of the last few years and of the present day may be enumerated, who are the fortunate possessors of some priceless and exquisite gems. Mr. Townly, Mr. Payne Knight, Mr. Hamilton, Mr. Hertz, Mr. Rhodes, Mr. King, Mr. Maskelyne,[1] Mr. Beresford Hope, the Rev. C. H. Townshend, in England; the Duke de Luynes, the Duke de Blacas, the Count de Pourtales, M. Fould, M. Roger, in France; Cardinal Antonelli and Signor Castellani in Italy.

Among the most famous public collections we may mention the Florentine, the Berlin, the Bibliothèque, Paris, the St. Petersburg, the Hague, the British Museum, the Museum, Naples; and among private, the Marlborough, the Devonshire, the Royal.

[1] Mr. Maskelyne's collection is not only remarkable for the exquisite specimens of glyptic art it contains, but also for the beauty of the stones themselves, which have been selected with deep mineralogical knowledge.

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# A MANUAL OF

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AND

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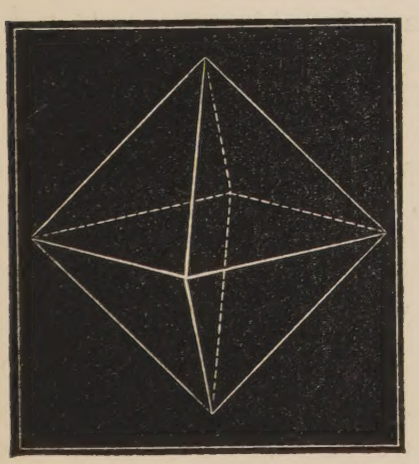
## THE DIAMOND.

The diamond is pure carbon crystallized. It is found both in regular crystalline forms, and in an amorphous state.



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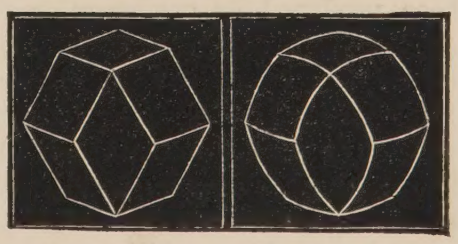


(2.) (3.)

Crystals of the Diamond.

The crystals are principally octahedrons and dodecahedrons.[1]

[1] According to Professor Goeppert, ("On the Vegetable Nature of Diamonds,") experiments show that diamonds cannot be produced by Plutonic agency, as they become black when subjected to a high degree of temperature. That they are, on the contrary, of Neptunian origin, and were at one time in a soft condition, is proved not only

The most famous mines of India were those of Golconda, in the territory of the Nizam; and at Raolcondal, near Visiapoor, in the Mahratta empire. Diamonds also occur in Bundelcund, near Panna, and in the Mahanuddy, near Ellore.

By far the largest quantity are, however, now imported into Europe from the Brazils. They are found mostly in alluvial soil derived from the materials brought down from the hills bordering the higher parts of the valleys in the district of Cerro di Fria, Minas Geraes, and San Paulo, and in the beds of rivers.[2]

by the impression of grains of sand and crystals on the surface of them, but also by the enclosure of certain foreign bodies, such as other crystals, germinating fungi, and even vegetable structures of a higher organization. If Professor Goeppert's conclusions be accepted, confirming and extending as they do the views held by Newton, Brewster, and Liebig, diamonds seem to be the final product of the chemical decomposition of vegetable substances. Professor Morris writes, however ("On Gems and Precious Stones"), "The supposition that the diamond has been derived from organic matter must not be adopted too hastily. The crystallized carbon may have been produced by condensation from a state of vapour, or by the gradual displacement of carbon, from its combination with chlorine or sulphur by some other element, or, as suggested by Professor Maskelyne in the following passage:—'There is another direction in which the production of the diamond may be looked for. It is well known that iron, when surcharged with carbon, though it may dissolve it in a state of fusion, deposits the excess of carbon when it cools, but in the graphitic modification. Some other metal, or some change in the conditions with the same metal, might cause the extrusion of the carbon in the form of diamond.'" In illustration of this suggestion, Mr. Morris exhibited a fine specimen of crystallized graphite, prepared by Mr. David Forbes from its solution in iron at a high temperature, and subsequently cooling. The varieties of crystalline forms would infer a slow process and freedom of motion among the molecules, due to a viscous state.

[2] Until lately the diamond had never been traced to its matrix, but this has now been done in at least two instances in Brazil. The first was in 1839, and the rock which contained it was described by

The Brazilian diamonds are of different specific gravity to the Indian, and are inferior in lustre and brilliancy. Diamonds of the best quality come from Borneo (Sarawak). Diamonds are also found in the gravels and sands of valleys and water-courses, on the sides of mountains, in Australia and in South Africa.

The Cape diamonds lately imported are said to be of an inferior quality, and to have a greasy, oily look. Yellow is the prevailing colour.

The diamond has been in all ages held in the highest estimation. Its brilliancy and play of colour is attributed to its high refractive and reflecting powers, and it was the observation of these properties which led Newton to infer it was combustible, a conclusion which was verified in the same year (1693) by the Florentine Academy. The diamond possesses also the property of flashing out the colour of the rainbow, which a piece of the heavy glass used to counterfeit the diamond possesses too, at least, as effective a degree. It becomes phosphorescent on exposure to the light, and the smaller diamonds become phosphorescent by a much shorter exposure than those of larger size. The most valuable diamonds are perfectly colourless, and are then said to be of the purest water. The colour suite is, however, extensive, blue, green, pink, yellow, brown, and black.[3] It occurs also opalescent.

M. P. Chasseau as *grès psammite*, a sort of sandy freestone, the locality being the Serro de Santantonio de Grammagoa. The discoverers of the deposit took from it many diamonds, as the rock was soft, but deeper it became harder, and consequently, more difficult to work. (King, "Precious Stones," page 59.)

Professor Maskelyne also writes: "In Brazil it has been traced to its rock home in itacolumite (a micaceous quartzose schist often containing talcose minerals and intersected by quartz veins) and also in a hornblende, also continuous with the itacolumite."

[3] M. Gallardo Bastant, who has much studied the origin of precious

Though the hardest known substance, a diamond is very brittle; a slight blow struck in the direction of the plane of cleavage, would have the effect of causing it to split.[4]

The diamond is valued according to its weight in carats ($3\frac{1}{2}$ grains each), the value rising very rapidly with the size.

Diamonds, when cut, are called brilliants, rose diamonds or rosettes, and table diamonds. Of these the brilliant is the most esteemed, as it displays the lustre of the stone to the greatest advantage.

In a brilliant, the table is the upper surface, the girdle is the broadest part of the stone, and should be at one-third of the whole depth, the portion above it being the bezel; the culet is the base, and should be two-thirds below the girdle, the whole depth of the stone being equal to the width across the girdle. Rose diamonds have triangular facets over the surface of the stone, the under side being flat.

Lasque diamonds are the flat thin stones used much in

stones, has communicated to the Academy of Sciences at Paris his opinion in regard to the change of colour in the diamond produced by heat. "The yellow diamond," he says, "is a compound of carbon and the fluoride of aluminium, and its yellow colour is changed into rose-colour. The same phenomenon is observed with the topaz, which is a compound of aluminium, silex, and fluoric acid, the yellow colour of which also changes to rose-colour at an elevated temperature. This change of colour is due to the absorption of carbonic acid, and analysis shows traces of this gas."

A green diamond is the rarest of all gems. A small one (about $1\frac{1}{2}$ carats) sold lately at Mr. Hancock's for 300*l.*

The large rose-tinted brilliant belonging to the late Duke of Brunswick sold at the sale of his things for 2824*l.*

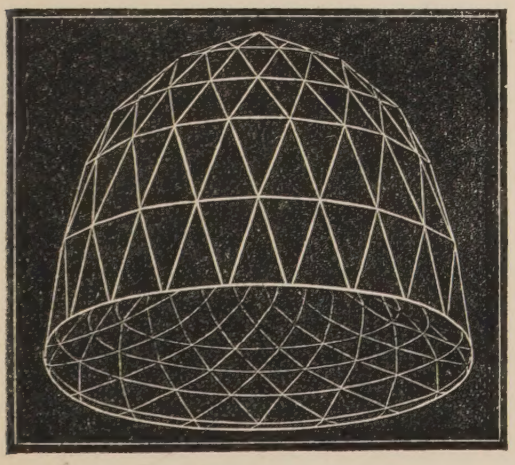
[4] This gem being composed of infinitely thin laminæ deposited over each other in a direction parallel to the faces of the primitive crystal, it can be easily split by a blow of a knife in the direction of these laminæ. (King, "Precious Stones," p. 49.)

native Indian work, in neck and head-bands, bangles, rings, &c.

The art of cutting and polishing diamonds was discovered by Louis van Berguen, a citizen of Bruges, in 1456, previously to which time the diamond was only known in its rough, or in its cleaned state. At the present day the cutting is effected chiefly by the Jews of Amsterdam.

The diamond was sometimes, but very rarely engraved. In the Paris Exhibition, 1867, was a ring with an engraved diamond, said to be by Jacopo da Trezzo. In the Royal Collection is the signet ring of Charles II., when Prince of Wales, bearing the device the ostrich plumes between the letters C. P., very neatly cut, upon a large yellow diamond, a table $\frac{1}{2} \times \frac{7}{8}$ in diameter. The Cavalier Costanza is said to have made several engravings upon the diamond in the beginning of the last century. Mr. King gives a notice of three engraved diamonds in the possession of Messrs. Hunt and Roskell.

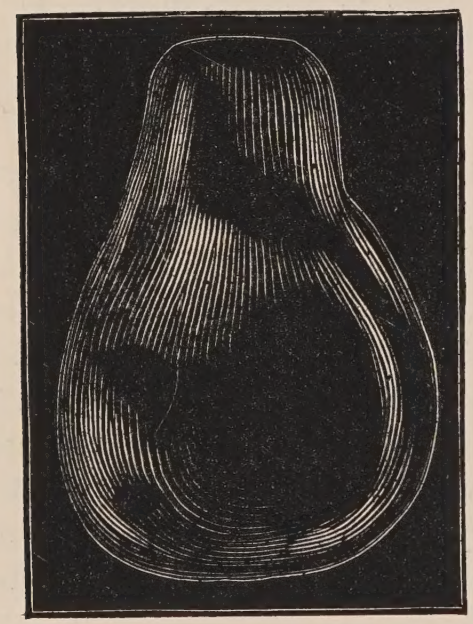
Small natural crystals, of the octahedral form, have been occasionally found, set in sixteenth-century rings, used for writing on glass, &c.



The Great Mogul. (4.)

The largest diamond of which there is any record is that described by Tavernier as belonging to the Great Mogul. According to him, it is a very high rose diamond, and weighing 280 carats. When Mirgimola, Tavernier writes, who be-

trayed the Great Mogul, his master, made a present of this stone to Shah Sehan, with whom he took refuge, it was in the rough, and weighed then 787½ carats.

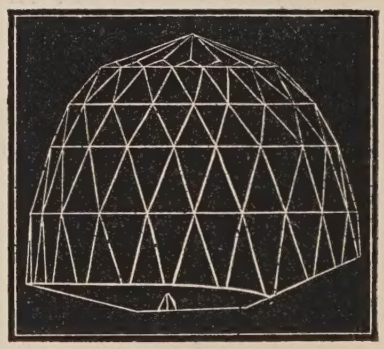


The Mattam. (5.)

Another diamond, celebrated for its size, is that of the Rajah of Mattam, in Borneo. It is of a pear-shaped form, and weighs in the rough 367 carats.

The Darya-i-Noor, or *sea of light*, the gem of the Persian collection, is a stone of 186 carats. Another fine diamond in the same collection is the *Crown of the Moon*, 146 carats.

The following are the names and weights of the most celebrated diamonds in Europe:—

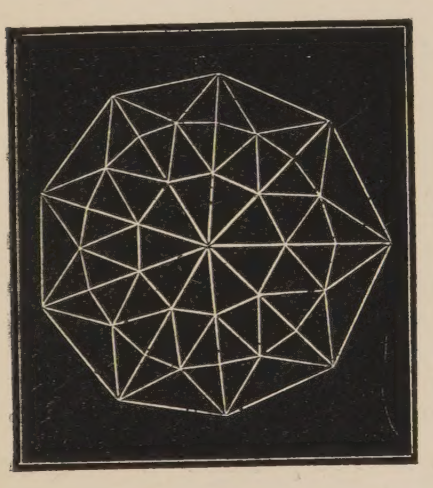


The Orloff. (6.)

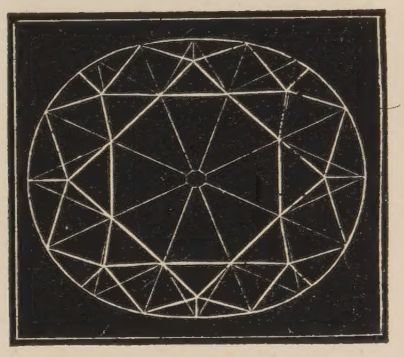
The Russian or Orloff diamond, 194¼ carats. It has the under side flat, and is rose-cut. It was bought by the Empress Catherine II. for 90,000*l.*, and a pension of 4000*l.* It is said to have formed one of the eyes of an idol in a Brahmin temple. It is now in the Russian Imperial sceptre.

The Austrian diamond, 139½ carats. It is yellow, rather thick, and is covered with facets, like a rose diamond, being pointed both at top and bottom; it is valued at 40,000*l.*

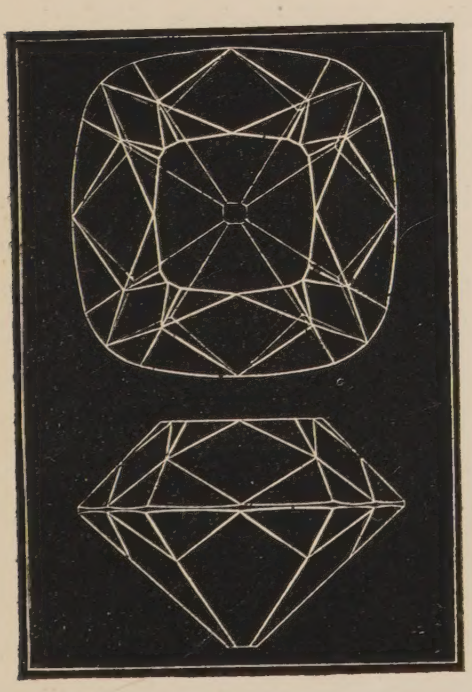
The Regent or Pitt diamond, 136½ carats. It was bought by the Duke of Orleans, then Regent of France, of Pitt, the Governor of Fort St. George, in the year 1717, for 135,000*l*. It was found in Golconda. It forms part of the French crown jewels.



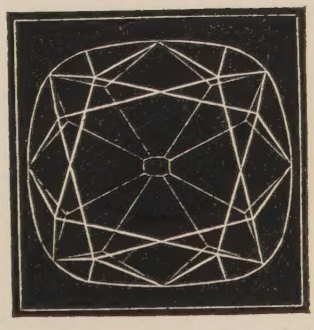
The Austrian. (7.)



The Pigott. (8.)



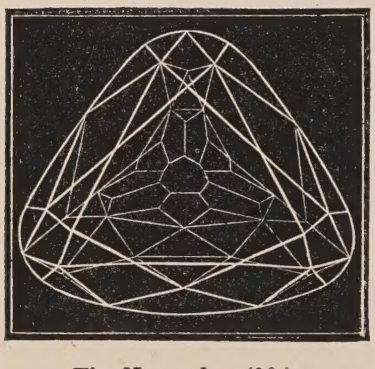
The Regent. (9.)



The Hope Diamond. (10.)

The Piggott diamond, $82\frac{1}{2}$ carats, was disposed of by lottery in London (1801) for 30,000*l.*

The Hope diamond, $44\frac{1}{2}$ carats. This brilliant, formerly the property of the late Mr. Hope, is of a most brilliant sapphire blue. It is valued at 30,000*l.*



The Nassack. (10.)

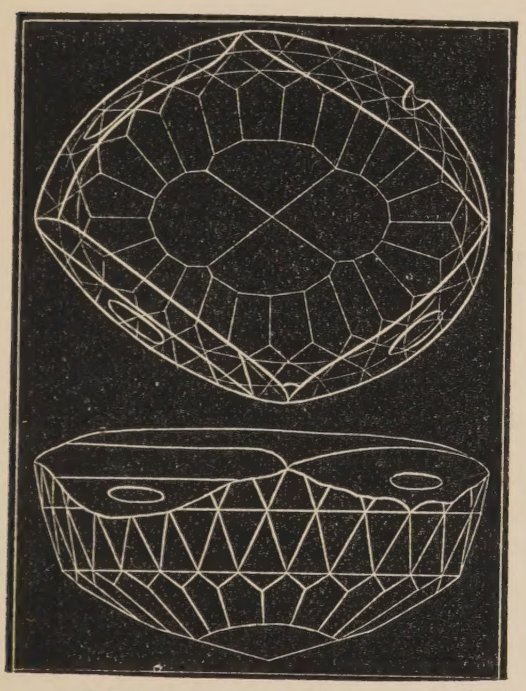
The Nassack diamond (the Marquis of Westminster), $893\frac{3}{4}$ carats, re-cut as a brilliant, $78\frac{3}{4}$ carats, captured from the Peishwah of the Mahrattas.

The Star of the South, in the rough, $254\frac{1}{2}$ carats, cut as a brilliant, $124\frac{1}{4}$ carats, found at the Bogageni mine, Brazil.

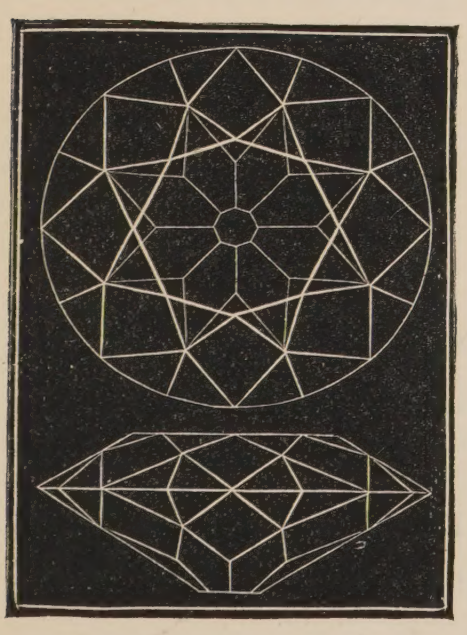
The Star of South Africa, $46\frac{1}{2}$ carats. It has been valued at 20,000*l.* It is now in the possession of Messrs Hunt and Roskell.

The most celebrated diamond of modern times is the Koh-i-noor, which became the property of the Queen of England on the annexation of the Punjaub by the East India Company in 1850. It is reputed to be 4000 years old by Indian tradition. It is said to have belonged to the Rajah of Mjayin 50 B.C., and to have remained in the possession of his successors until India was subdued by the Mohammedans. It is mentioned by Tavernier in 1665, as the property of the Great Mogul. It was called the Koh-i-noor, or "Mountain of light." When brought to this country it weighed $186\frac{1}{2}$ carats. The beauty of this stone being greatly marred by its irregularity of form, and the imperfect manner in which it had been cut, it was determined to re-cut it. This was skilfully and successfully accomplished, under the care of Messrs. Garrard, by two workmen from the great atelier of Mr. Foster of Amsterdam. Although the weight

of the stone has been reduced from 186¼ to 103¾ carats, its brilliancy and general appearance have been greatly improved.



Koh-i-noor before re-cutting. (11.)

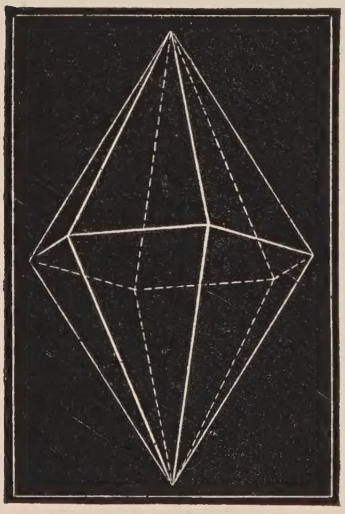


Koh-i-noor after re-cutting. (12.)

In addition to its value as a precious stone, the diamond is employed for engraving and cutting glass, in splinters for drilling, and, reduced to powder, for polishing and cutting gems. This kind, which consists of fragments of diamond too small for jewellery, is termed Bort. Carbonado is a term applied to an amorphous, black, imperfectly crystallized variety which comes from the province of Bahia, Brazil. It is said to occupy a position between diamond and anthracite.

# THE RUBY.

The ruby, the sapphire, the oriental topaz, the oriental emerald, the oriental amethyst, are pure crystallized alumina, and are all classed under the name of corundum. They are identical in every particular, differing only in colour.



Crystal of Corundum. (13.)

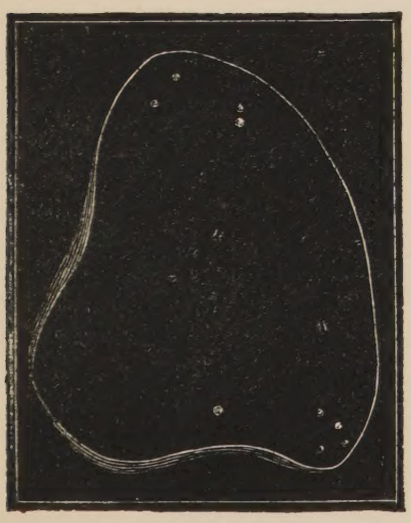
The ruby is said to be tinted by the peroxide of iron, the sapphire by the protoxide, and the violet tint may possibly be produced by an admixture of manganese with the iron. They occur crystallized in variously terminated hexagonal prisms, and in rolled masses, and are generally found in beds of rivers, or associated with crystalline rocks.

The ruby or red sapphire is considered, next to the diamond, the most precious of all gems. When of a large size, good colour, and free from flaws, it exceeds even the diamond itself in value. Rubies are for the most part small, seldom exceeding eight or ten carats. The specific gravity is 3·9 to 4·1, its hardness superior to any known substance except diamond, being numbered 9 in Moh's scale. It is

composed of alumina, and coloured by traces of metallic oxides, chrome, &c.

| | |
|---|---|
| Alumina . . . | 98·5 |
| Oxide of iron . . | 1·0 |
| Lime . . . . | 0·5 |

The colour of the ruby varies from the lightest rose-tint to the deepest carmine. The colour most prized is a rich and lovely crimson known as the "pigeon's blood," but its scarlet tints are also beautiful. It is never a large stone ; for whereas the sapphire occurs in very considerable masses, a ruby above the size of three carats is worth more than a diamond of the same weight. The finest stones are found in the sands of rivers in Ceylon and in the Capelan mountains, near Siriam, a city in Pegu. The ruby mines of Burmah, whence come the finest stones, have been long famous. They are said to be situated about sixty or seventy miles from the capital, in a north-easterly direction. These mines are rigorously guarded, no European being allowed to approach them on any pretence. They are a royal monopoly. The King of Burmah is said to retain for his own use the rarest and finest specimens. One of his titles is the "Lord of Rubies."



Ruby of the Shah of Persia. (14.)

The largest known ruby is that mentioned by Chardin, on which was engraved the name of Sheik Sephi.

Another, also belonging to the Shah of Persia, a drawing of which has been given by Tavernier, weighed 175 carats. The King of Bur-

mah is said to possess a ruby as large as a pigeon's egg.

The largest ruby ever seen in Europe is that presented by Gustavus III., of Sweden, to the Czarina, upon his visit to her in 1777. It is equal in bulk to a small hen's egg, and is of fine colour.

A very large one is in the French crown jewels. It adorns the order of the Golden Fleece, and is cut into the form of a dragon with extended wings.[5]

[5] At the sale of the Duke of Brunswick's jewels (April, 1874), a Chinese idol, cut out of a single ruby of immense size, was sold to M. Achard, of Paris, for 15,000 francs (600*l*). It was taken from the summer palace of Pekin on the sacking of that place by the French troops, and was purchased by the Duke on the return of the expedition from China. The stone was not to say of remarkable purity, but the workmanship of the image was excellent.

# THE SAPPHIRE.

THE sapphire is the blue variety of corundum. Like the ruby, it is composed of pure alumina coloured by oxide of iron. In hardness it is equal to that of the ruby. It occurs of all tints and shades of blue. Jewellers have divided them into two kinds, the male and female, the first being of a deep indigo colour, and the second a light blue. The latter is also sometimes termed a water sapphire. The colour which approximates to blue velvet of the shade formerly called "bleu de roi" is the most valuable. The sapphire occurs generally in crystals of much larger size than the ruby. This stone is chiefly brought from Ceylon and Pegu.

The largest sapphire known, weighing 132 carats, is in the Musée de Mineralogie, Paris. It has been called the "Wooden-Spoon Sellers," from the occupation of the man who found it in Bengal. It is also called the "Ruspoli," after a former owner. It is lozenge-shaped with six faces, and was bought by Perret, a Parisian jeweller, for 170,000 francs (6800*l.*). A statuette of Buddha, about an inch high, carved out of one entire and perfect sapphire, is in the Mineralogical Department of the British Museum.

Among the sapphires famous for their historical interest is that in the Lennox or Darnley jewel, belonging to her Majesty. This historic relic is a pendant golden heart, set

with a heart-shaped sapphire. Its date is about 1575, and it was made for that Margaret Douglas whose husband and son, the Regent Earl of Lennox and Darnley, Mary's consort, came both of them to their ends by murder. Another, not less interesting, is the sapphire which, set as a ring, was at the moment of Queen Elizabeth's death, when all the doors were closed by order, thrown out of a window by Lady Scrope to her brother, Robert Cary, son of Lord Hunsdon, and later Earl of Monmouth, who at once took horse to Scotland and presented the token to James VI. in proof of the truth of that fact, of which he brought the first tidings. It now forms the centre of a diamond star, and is in the possession of the Countess of Cork and Orrery. The Talisman of Charlemagne, which was found suspended from the neck of the Emperor on the opening of his sepulchre in 1166, has two large rough sapphires, and a portion of the Holy Cross in the centre, set round with gems. It was presented to Napoleon by the clergy of Aix-la-Chapelle. It afterwards came into the possession of the late Emperor, Louis Napoleon III.

In the centre of the cross on the summit of the Imperial State Crown of England is a rose-cut sapphire, which tradition says came out of the famous ring of Edward the Confessor, so long treasured up on his shrine, and the heritage of which gave his successors the miraculous power of blessing the *cramp-rings*. In the front of the crown is a large, broad-spread sapphire (partly drilled), purchased for the crown by his Majesty King George IV.

A superb sapphire, engraved with the heads of Henry IV. and Marie de Medicis, face to face, signed 1605, by Coldorè, the gem portrait-painter of Queen Elizabeth, was lately in the collection of M. T. F. Leturq of Paris.

In the Duke of Brunswick's collection lately sold at

Geneva was an engraved sapphire ring, bearing the royal arms of England, which once belonged to Mary, Queen of Scots.

The sapphire was the stone generally used for the Episcopal ring, as prescribed by Pope Honorius.[6] In the Londesborough collection is an Episcopal ring, gold, with sapphire, French work of the twelfth century. It was found in the tomb of Thierry, Bishop of Verdun, 1165. The ring of William of Wykeham, Bishop of Winchester, was a massive plain gold ring set with a sapphire. The word "sapphire," according to some, appears to come from the Syriac *saphilah*, the name in that language of the sapphire. The sapphire, in Greek *sappheiros*, M. Maskelyne writes, was the name applied by the Greeks and Romans to what we call lapis lazuli. But it is obviously a word foreign to the Greek tongue. According to the Talmud, the tables of the law were fashioned of sappir ; the word is connected with the roots from which are derived the Hebrew terms for a book, writing, or engraving. This root is "safar," to engrave, but it seems also to have the meaning "to shine," and this may be the source of the application of the name sappir to a precious stone.

### White Sapphire.

White sapphire is the pure colourless crystallized alumina,

[6] The writer of an article on Finger-Rings in the "British Quarterly Review" (July, 1874), says, "In 1194 the fashion of the episcopal ring was settled by Pope Innocent III., who ordained that it should be of solid gold, and set with a precious stone, on which nothing was to be cut. The stones usually chosen were the ruby, indicating glory, the emerald, for tranquillity and happiness, and crystal, for simplicity and purity. A cardinal's ring is set with a sapphire to denote the high-priesthood, and is given when a title is assigned to him."

generally, however, exhibiting a faint blue tint, which is sometimes expelled by heat. When cut and polished, from its brilliancy it has been passed as a diamond. It is also called Lux Sapphire.

### Oriental Topaz.

The oriental topaz is a name given by jewellers to the yellow variety of corundum. It is generally of a pale straw yellow, but sometimes exhibits a beautiful golden tint, and almost equals the diamond in brilliancy, for which it is frequently mistaken. Some good specimens set in rings are in the Townshend collection, S.K.M.

### Oriental Amethyst.

The violet variety of corundum is termed the oriental amethyst. It is often formed by a mixture of ruby and sapphire in the same crystal. It may be distinguished from the ordinary amethyst by its superior brilliancy and play, as well as by its hardness. It is a gem of rare occurrence. Jewellers frequently confound it with the ordinary amethyst. A fine specimen set in a ring, from the Hope collection, is in the Townshend collection, S.K.M.

### Oriental Emerald.

The oriental emerald is the green variety of this species, but it lacks the rich hues of the splendid mineral after which it is named, the true emerald. It is lustrous, but almost invariably of an extremely pale hue. It is said to be the rarest of all gems; there are some fine specimens in the Grüne Gewolbe, Dresden. In the British Museum are two specimens of this rare stone. The author also possesses a small one of a deep green colour.

### Oriental Aquamarine.

The oriental aquamarine is a greenish-blue sapphire. When the green is of an olive tint, it is termed an oriental peridot.

### Star Sapphire.

The star sapphire, or, as it is sometimes called, asteria, is formed from the more opaque kind of stones, which when in the boss form (or *en cabochon*), exhibits a six-rayed star corresponding in the direction of the rays with the direction of those planes along which the crystal may be "cleaved" or easily split. Care is taken to get the centre of the star as nearly as possible in the middle of the stone. Star sapphires are generally of a pale blue, sometimes nearly white, but when these stones possess a fine blue colour, large prices have been obtained for them.

### Star Ruby.

The star ruby is a similar stone to the above, but of a red colour. It generally occurs of a smaller size than the star sapphire, and is much rarer. These stones are much valued in the east. All these star stones come from Ceylon. In the Townshend collection, S.K.M., are some good specimens of these stones.

### Girasol Sapphire.

The girasol sapphire is a stone similar to the above, which shows a glimmering light on the surface. Sapphir chatoyant is a name given by French jewellers to a similar stone, which displays very brilliant pearly reflections on a red or blue ground.

### Opalescent Sapphire.

This sapphire is of a milky white tint, exhibiting opalescent reflections. A fine example is in the Geological Museum, Jermyn Street.

## PRECIOUS SPINELS.

The precious varieties of spinels, which comprise a large mineralogical group, consist essentially of alumina, combined with magnesia, and tinted, perhaps, with iron. They generally occur in octahedral crystals. These are the spinel ruby, the balas ruby, the almandine ruby, and the rubicelle. They are found in Ceylon, Siam, Pegu, and other eastern countries, in rolled pebbles, in the beds of rivers. The spinel ruby is a scarlet variety of considerable fire, and of a rich colour. The balas ruby is of a delicate rose-pink colour, showing a blue tint when looked through. Its name is said to be derived from Beloochistan, anciently Balastan. Both these stones are termed rubies by jewellers, and deeper tinted kinds are sometimes sold for the true ruby. They may be readily distinguished from the Oriental or true ruby by inferior hardness, and specific gravity; and also by the crystallization, which is of an octahedral form. Many of the famous stones that pass under the name of rubies belong to this species. The famous ruby said to have been given to Edward Prince of Wales, the Black Prince, by Don Pedro of Castile, after the battle of Nagara, A.D. 1307, and now in the Imperial State Crown of England, is a spinel. Almandine is the name applied to the variety which sometimes occurs with a tint containing more blue than the balas ruby, and approaching the almandine garnet in hue. Rubicelle is a name given to the orange-red variety.

# THE CHRYSOBERYL.

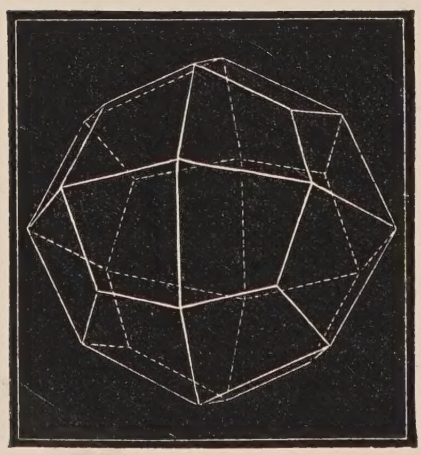
The chrysoberyl, called also by jewellers the Oriental chrysolite, is a compound of alumina and the oxide glucina. It belongs to the rhombic system of crystallization. It usually occurs of a greenish-yellow colour, and sometimes of a yellowish-brown hue. It is a very brilliant gem, and is sometimes used in jewellery. In brilliancy and transparency it nearly equals the diamond, while in hardness it is very nearly the rival of the sapphire. It is found in Brazil and Ceylon, in rolled pebbles, in the alluvial deposits of rivers. A fine specimen of this stone, for which Mr. Hertz is said to have received 300 guineas from Mr. Hope, is among the recent acquisitions of the mineral department of the British Museum.

## Cymophane.

Cymophane is a term given by French jewellers to the mineral species of the chrysoberyl, which, when cut *en cabochon*, exhibits like a drop of water, or the pupil of an eye, moving about inside it, and also a band of light floating on its surface. Its name is derived from κῦμα, a wave, and φαίνω, to appear. This variety is also called the chrysoberyl cat's-eye. Fine specimens of this stone may be seen in the Townshend and Beresford Hope Collections in the South Kensington Museum.

# THE GARNET.

PRECIOUS garnets are silicates of alumina, magnesia, lime, and iron, and are mostly found in rhombic dodecahedral crystals, in granite or mica slate. Ceylon, Pegu, Brazil, and Bohemia, supply these stones. The word "garnet" is said to be derived from *granaticus*, as its prevailing colour resembles that of the seed of the pomegranate.



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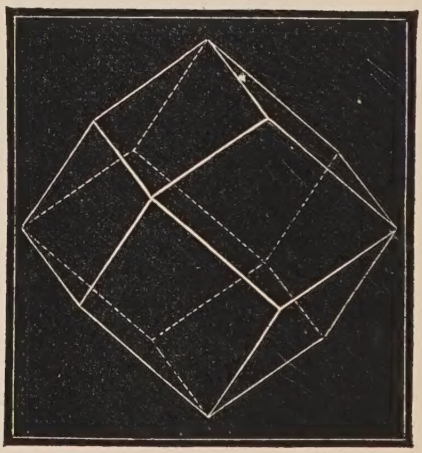


Crystals of Garnet. (16)

From the brilliancy and richness of their colour, they are much used in jewellery.

There are many varieties of this stone, which are distinguished by their colour, and also by the difference of their

chemical composition. Of these, the best known are the almandine, the siriam, the essonite, the hyacinthine, the pyrope, the guarnaccino.

The most esteemed kind is the siriam, or oriental garnet, so called from Siriam, a city of Pegu, it being formerly the chief mart for the finest garnets. The colour ranges from the deepest crimson to a violet purple, in some instances rivalling the finest oriental amethyst; the red colour being due to the presence of protoxide of iron, and the violet to manganese.

The almandine is an alumina iron garnet of a beautiful violet or amethystine tint. The word "almandine" is said to be a corruption of Pliny's alabandine, a term applied to the garnet from its being cut and polished at Alabanda.

The essonite, or cinnamon-stone, is an alumina lime garnet of a cinnamon or reddish-yellow tint.

The hyacinthine garnet is of a dark orange-red tint. It is frequently confounded by jewellers and some writers, with the true hyacinth or red zircon.

The pyrope or Bohemian garnet (a variety of iron garnet) is a deep blood red, and of a fiery character, hence it is sometimes also called fire garnet. It is found in Bohemia Saxony, and other parts of Germany.

Guarnaccino is the Italian name for the brownish-red garnet.

The vermeille, or vermillion garnet, is of an orange-red colour.

Carbuncle is the name given in jewellery to the garnet, when cut *en cabochon*; that is to say of a boss form, usually hollowed out underneath to allow the colour of the stone to be seen.

The star garnet is a variety of this species, which, when held in the sun, shows a star, or rather a cross on the sur-

face, having the appearance of having been scratched on the stone.

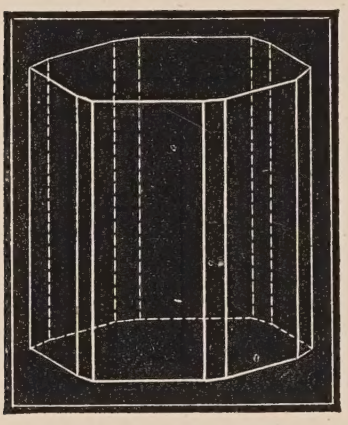
Small cups are occasionally made in India from the larger crystals of this stone, which sometimes occur the size of a fist.

# THE EMERALD.

THE emerald is a silicate of alumina and glucina, which, it is said by some mineralogists, owes to a little chromium the transcendent green which characterizes it.[7] It crystal-

[7] Until very lately, Mr. Bristowe writes ("Glossary of Mineralogy," p. 125), the colouring matter of the emerald was supposed to be due to the presence of one or two per cent. of oxide of chromium. This has, however, been proved to be incorrect by Mr. Lewy's recent chemical investigations into the formation and composition of the emerald of Muzo. The quantity of chromic oxide obtained by analysis was so small as to be inappreciable, in fact, too minute to be weighed separately, and the beautiful tint of the emerald is shown by M. Lewy to be produced by an organic substance, which he considers to be a carburet of hydrogen, similar to that chlorophylle which constitutes the colouring-matter of the leaves of plants. Those emeralds are of the darkest tint which contain the greatest amount of organic matter, and the colour is completely destroyed at a low red heat, which renders the stone white and opaque, while, on the other hand, heat produces no loss of colour in those minerals which are coloured by oxide of chrome, breaking readily at right angles to the axis of the prism. The emeralds, when first extracted from the mine at Muzo, are so soft and fragile that the largest and finest specimens can be reduced to powder merely by rubbing them between the fingers, and the crystals often crack and fall to pieces after being removed from the mine, apparently from loss of water, as the chrome garnet Uwarovite. The organic colouring matter of the emerald is probably derived from the decomposition of the animals whose remains are now found fossilized in the rock which forms the matrix of the stone. Besides the organic colouring-matter M. Lewy obtained from 1·65 to 2·15 of water, from which he has arrived at the conclusion that emeralds have been formed in the wet way, that is to say, that they have deposited from a chemical solution.

lizes in hexagonal prisms, with the sides striated longitudinally. It is rarely found without a flaw, and is extremely brittle. It ranks next the ruby in value. It occasionally shows a star in the section, of which there is an example in the Townshend collection in the South Kensington Museum. The stones of the finest colour are found at Muzo, in New Granada, near Santa Fé de Bogota, in a calcareous rock.



Crystal of Emerald. (17.)

Indian emeralds are generally of a pale green, and full of flaws. They are said to come from the mountains of Canjargum, in the Deccan, which have also yielded an abundant supply of beryls.

In the Loan Exhibition of 1872 were some oriental emeralds, set as drop earrings, contributed by her Majesty the Queen. They are remarkable for their size, the stones are uncut, but polished over the surface and pierced.

The mines of Ekaterinberg in Siberia furnish emeralds of superior quality.

The emerald said to be the largest known is the property of the Duke of Devonshire: it measures 2 inches in height, and $2\frac{1}{4}$ across. It weighs 8 oz., 18 dwts. It is reported to have been brought to this country by Don Pedro, and was found at Muzo.

This is surpassed, however, by a magnificent stone in the possession of Duleep Singh, which is three inches long, two wide, and half an inch thick. Mr. Eastwick mentions an emerald in the Persian collection as big as a walnut, covered with the names of kings who had possessed it.

An emerald $1\frac{1}{2} \times 1\frac{1}{2}$ inches was exhibited by Harry Emanuel at the Exhibition 1862. A vinaigrette in the Hope collection is carved out of two large emeralds.

## The Beryl.

The beryl is of the same chemical composition as the emerald, and comprises two varieties, the aquamarine, of a pale azure or sea-green tint, and the yellow. The crystallization is the same as that of the emerald. Indian beryls are from Canjargum, in the Deccan. Crystals of beryls of enormous size are found in North America. One beryl from Grafton, N. A., weighs 2900 lbs.; it is 32 inches in one direction, and 22 in another, transverse, and is 4 feet 3 inches long.

Some fine specimens are found in Siberia, in the Mourne Mountains, Co. Down, in Bohemia, Elba, and Brazil.

Aquamarines are frequently employed in jewellery, in bracelets, necklaces, brooches, &c. An aquamarine, said to be the largest known, set as a sword-hilt, which formerly belonged to Joachim Murat, King of Naples, is in the Beresford Hope collection, S.K.M.

Another equally large, if not larger, is in the possession of Mr. Hancock, Bond Street. It measures $2\frac{7}{8} \times 2\frac{5}{8}$ inches.

There is a large crystal of beryl in the British Museum. The name is derived from the Persian *belur*, changed by the Romans into *beryllus*.

## Euclase.

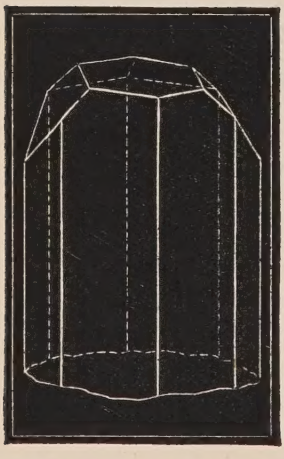
The euclase is also of the same chemical composition as the emerald. It is of a pale blue colour. From its rarity and brittleness, it is never used in jewellery. It is, however, susceptible of a high polish. It is found in Peru and Brazil.

## Topaz.

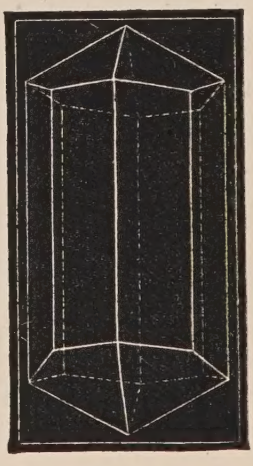
The topaz consists of a fluo-silicate of alumina, crystallizing in rhombic prisms with striated sides.

The topaz has been divided by jewellers into two kinds, the oriental and occidental. The oriental is the yellow sapphire, and the occidental a fluo-silicate of alumina.

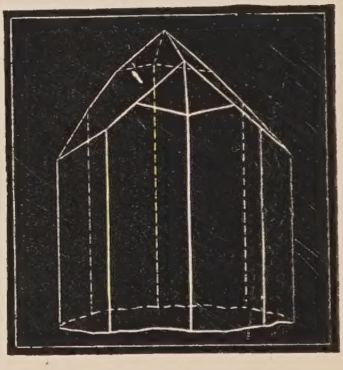
The occidental topaz may be divided into three varieties, the yellow, the blue, and the white. The yellow, the prevailing tint, passes from a pale yellow to a rich orange



Saxony. (18)



Brazil. (19.)



Siberia. (20.)

Crystals of Topaz.

colour. Some jewellers call this deep orange tint an oriental topaz. The finest of these come from Villa Rica, Brazil. Saxony also furnishes topazes of a pale yellow, bordering on canary colour.

They are found also in Asia Minor, Ceylon, Pegu, Siberia, in Scotland, in Aberdeenshire, and in Ireland, in the Mourne Mountains.

The blue comes from Brazil, and is sometimes called the Brazilian sapphire.

The white is a colourless variety found at Minas Novas

in Brazil, a name by which this kind is called in that country. In lustre the white topaz surpasses rock crystal. The purest varieties are called Gouttes d'Eau (Pingos d' Agua).

In the pink topaz this colour is produced by exposing the orange topaz to a low red heat: it is sometimes termed the Brazilian ruby. The pink variety is, however, sometimes found in nature.

The word "topaz" is derived from Topazios, the name of an island in the Red Sea, whence, according to Pliny, the ancients obtained the stone known to them as topazios, but which was in reality a chrysolite. The true topaz was unknown to the ancients.

### Chrysolite.

Chrysolite is a silicate of magnesia, of a pale yellow, slightly tinted with green. It is usually found in angular or rolled pieces, rarely crystallized. The crystals, usually 8, 10, or 12-sided prisms, are almost tabular. It occurs in Upper Egypt, Mexico, Auvergne, and near Constantinople.

As a gem the chrysolite is deficient in hardness and play of colours, but when the stones are large and of good colour, and well cut and polished, it is made into necklaces, hair ornaments, &c. From its softness it loses its polish and wears at the edges. It was the topazios of the ancients.

### The Peridot.

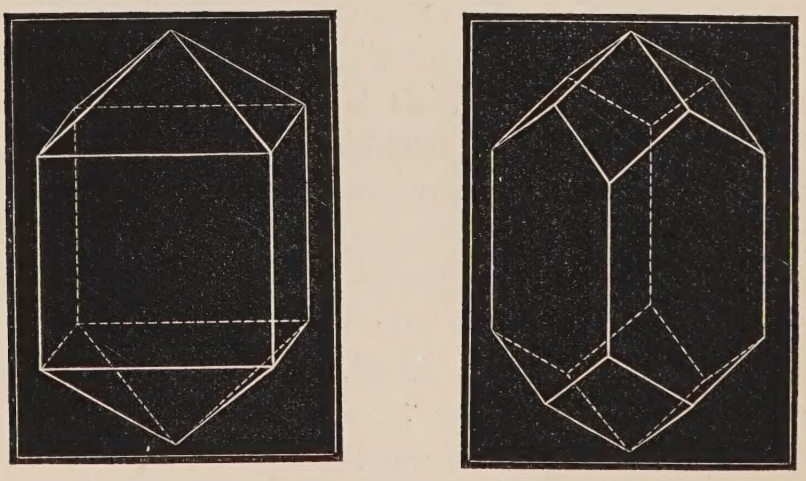
The peridot is a yellow green variety of the chrysolite. It is found in rolled pebbles in Ceylon, Persia, Egypt, and Bohemia. It is soft for a precious stone, being just under quartz in hardness. It was rarely used by the ancients for engraving on, but modern works frequently occur in it. The name Peridot is derived from the Arabic *feridet*, a precious stone.

## Olivine.

Olivine is an olive-green variety of the same stone, but inferior in colour and clearness. It occurs in yellowish-green, or olive-coloured, embedded masses and grains. Minute specimens occur in lavas and basalts; grains of it have been also discovered filling up cavities in aërolites.

## Zircon or Jargoon.

The zircon is a silicate of zirconia crystallizing in square prisms, terminating in pyramids. Zircons occur embedded in granite, syenite, basalt, lava, and are found in alluvial beds in Ceylon. It has a somewhat varied colour suite, white, green, yellow, red.



(21.) Crystals of Zircon. (22.)

The white, or colourless variety, is the nearest match in brilliancy and refractive energy to the diamond. It is most abundant in the district of Matura, in Ceylon, whence it has its common name in that country of Matura diamond. The colourless zircon is also cut and sold as a false diamond in the bazaars of India.

The green olive-tinted zircon is found in Ceylon.

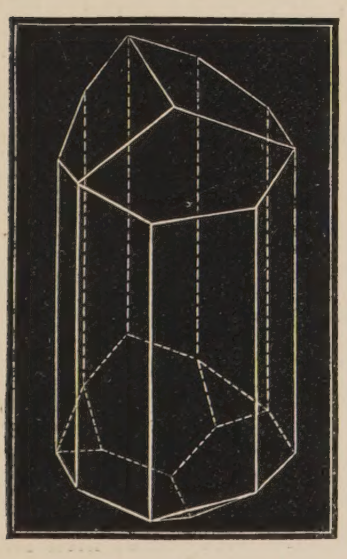
The yellow is of a honey tint, also found in Ceylon.

The red or true hyacinth, or jacinth, is remarkable for its fine lustre and hardness. It occurs in the sands and alluvial deposits of rivers in Ceylon, and is often sold by the inhabitants as an inferior ruby. It is always found in small grains, and never of a large size. It is also found at Expilly, in Auvergne, and lately at Mudgee in Australia, in rolled pebbles of a larger size. The hyacinth or jacinth, frequently sold by dealers, and mentioned in collections of engraved gems, and in the writings of some recent authors, is in reality a hyacinthine garnet. The name zircon is from the Arabic word *zerk*, signifying a gem, and the word hyacinth from the Persian and Arabian *yacut*, a ruby.

The grey or slightly smoky variety is by some mineralogists solely named jargoon.

## Tourmaline.

Tourmaline is a silicate of alumina with boracic acid, occurring in hexagonal crystals. Its optical characters are valuable, in consequence of its property of absorbing one of the polarized rays of light into which it divides every ray that enters the side of its prism-shaped crystal. Its colour-suite is very extensive—black, brown, blue, green, red, yellow, and white, or colourless. The finest colour is that of the ruby-red variety termed rubellite or siderite. When free from flaws, it constitutes a fine stone. The finest known specimen of this gem is in the collection of minerals in the British Museum.



Crystal of Tourmaline. (23.)

It is of uncommon form and dimensions, and was presented to Colonel Symes by the King of Ava. It has been valued at 1000*l.* This variety comes from Ava, Ceylon, and Siberia. The green variety from Brazil is called the Brazilian emerald, and is often used as a precious stone. It is worn by the Roman Catholic Bishops of South America as a signet stone.

The indigo-blue kind from Brazil is called Indicolite.

The yellow and brown varieties are chiefly brought from Ceylon. The yellow has been termed the Ceylon chrysolite.

Black tourmaline or schorl is very abundant in granite.

The white variety, which is very rare, is found in the island of Elba and in Siberia.

The name tourmaline appears to be derived from the Cingalese word *turamali.*

## Iolite.

Iolite is a silicate of alumina, magnesia, and iron, crystallizing often in hexagonal prisms. It is found in Spain, Bavaria, Greenland, Sweden, Norway, Finland, and in Ceylon in rolled pebbles. It is also termed dichroite, as it shows different colours in two directions, appearing of a deep blue colour along the vertical axis, but red or yellowish grey when viewed by transmitted light at right angles to the axis of the prism.

It is occasionally employed as an ornamental stone, and is sometimes passed off as a sapphire.

The transparent variety, found in small rolled masses in Ceylon, is styled sapphire d'eau, or water-sapphire, by jewellers.

Its name is derived from ἴον (violet), in allusion to its bluish-violet colour, when viewed in one direction, and the name dichroite, from its presenting two colours.

### Kyanite.

Kyanite is a silicate of alumina of a delicate sky-blue ; when transparent, and of a fine blue colour, it is sometimes cut and employed as a gem. It is generally imported from India, cut and polished as a variety of sapphire. It is, however, deficient in hardness. It is found at St. Gothard, in Switzerland, in Carinthia, Bohemia, and Styria. Its name is derived from κύανος (blue).

### Moonstone.

Moonstone is a translucent variety of adularia, which is a silicate of alumina, potash and soda. It presents a pearly or silvery play of colour not unlike that of the moon, which gives it its name. It is held in considerable estimation as an ornamental stone, but is more prized on the Continent than in England. It is soft compared with other gems. The finest stones are brought from Ceylon.

### Crocidolite.

Crocidolite is a silicate of iron, with a fibrous structure resembling asbestos, and showing, when cut and polished *en cabochon*, a chatoyant lustre like the quartz cat's-eye. It is found in Southern Africa of bluish colour, green, and yellowish-brown, the last variety being the most lustrous.

### Sunstone.

Sunstone is a translucent variety of adularia or potash felspar (orthoclase), of yellowish colour, with minute spangles of oxide of iron disseminated throughout, and reflecting the light at certain angles. It comes from Ceylon, Siberia, and Norway.

### Amazon Stone.

Amazon is a pale green variety of felspar (orthoclase). It is opaque, and exhibits a nacrous reflection ; it is exces-

sively brittle, but susceptible of a fine polish. The name is derived from the circumstance of its first discovery by the Spaniards amongst the ornaments of the Indians dwelling upon the River Amazon, near which it occurs in rolled masses. The stone from Lake Baikal in Siberia is sometimes, though rarely, in pieces sufficiently large to be made into small vases and other ornaments.

### Diopside.

A silicate of magnesia and lime. It is of various shades of green. It is found in translucent crystals, in veins traversing serpentine at Ala, in Piedmont. The more transparent crystals are sometimes cut and worn as gems.

### Hyperstene.

A silicate of magnesia, lime, and a large proportion of protoxide of iron ; it is of greyish or greenish-black colour with lamellar structure, and a bright metallic, pearly lustre. It is found in Labrador and Greenland. It is sometimes cut for ring-stones and brooches in France.

### Idocrase

Is a silicate of alumina, iron, lime, magnesia. It is found in crystals in the cavities of volcanic rocks in Mount Vesuvius. The finest specimens, however, come from Ala, in the Val di Brozzo, Piedmont. Its colour suite is extensive —brown, yellow, orange, blue, green, rarely black. It is cut into ring-stones and other ornaments at Naples, and Turin, and sold under various names, as chrysolite, hyacinth, according to the colour. At Naples they are called "Gemme di Vesuvio."

### Lapis Lazuli

Is a silicate of alumina, soda, lime with sulphur, of a beautiful azure colour. Spangles of iron pyrites sometimes occur disseminated through the stone, bearing a great

resemblance to gold. It is generally found in granite, and is brought from Persia, China, and Bucharia. Notwithstanding its deficiency of lustre, and its not being susceptible of a very exquisite polish, the beauty of its colour has caused this stone to be used in jewellery generally for brooches and shirt studs. It is seldom employed for seals on account of its comparative softness. In China and India this stone is carved into cups, vases, dagger-handles, &c. The beautiful pigment ultramarine, used in the arts, is produced from this stone, when finely powdered and carefully washed. The name *lazuli* is probably derived from the Arabic *azul*, blue.

### Noble Serpentine.

A hydrated silicate of magnesia. This name is applied to the purer translucent and massive variety of serpentine, with a rich oil-green colour.

### Nephrite—Jade.

An anhydrous silicate of magnesia. Its colour varies from a creamy white to a dark olive-green. The hardness of this stone renders it excessively difficult to cut and polish. It is translucent, very tough, breaking with a coarse, splintery fracture. It is found in Egypt, China, from the quarries of Kuen-lun, New Zealand, North America.

China furnishes ornamental vases and cups of this stone, elaborately carved, where the variety called Yu is highly prized.[8] It is carved into handles of swords and daggers in

[8] "Between Yurkland and Ladak, and about a mile from Gulbusha, we found numerous remains of the old jade works, piles of rough broken lumps of jade, which had been thrown aside, also small caves and borings in the alluvial bank, where they had dug out the 'water-deposited' pebbles of jade, the Yeshamba-i-ab, which from its purity and compactness is considered the most valuable. The

India. Cups of a mottled variety come from Siam. In New Zealand a variety called "poenamu" is fashioned into clubs (meri), hatchets, idols (called Tiki). The pure translucent kind is made into ear-pendants, and worn by the chiefs. It is also used in New Caledonia for hatchets. The name nephrite is from the Greek *νεφρός*, *kidney*, in allusion to the belief entertained in former times of its influence in frequently curing diseases of the kidney. The French name jade is said to be derived from *hi-jada*, the Spanish word for kidney. According to Estner it is from the name *igida*, by which it is called in India.

### Jadeite.

A silicate of alumina and magnesia. It is an opaque stone, of a green colour mixed with white. It is often used in India for sword-handles and other ornaments. The Chinese variety is of a delicate green. The rude figures of green colour, not transparent, mixed with white, carved and skilfully polished, found in tombs in Mexico, are of this stone. It was named Chalchituitl by the Aztecs, who held it in high estimation. The elaborate clasp fastening the monarch Montezuma's imperial robe was of this stone. It was supposed by the Spaniards to be an inferior emerald (*baja esmeralda*).

quarries extend over an irregular belt of a mile or so in length, and 200 or 300 feet in breadth along the mountain side, and in this space there are the entrances of at least 100 mines.

"Jade-rocks were often many feet in thickness. The colour of the cut surface varies from a light straw-green, through the different shades of green up to nearly black. The latter resembles the nephrite of Siberia."—"The Jade Quarries of Kuen-lun," by Cayley. *Macmillan's Magazine*, Oct., 1871.

Dr. Rennie ("Peking and the Pekingese," vol. i. p. 291) mentions seeing at Peking a very rare variety of green jade, to which great value is attached. It was termed Fate-su-ee.

### Labradorite, or Labrador Felspar.

A silicate of alumina, lime, and potash. It exhibits beautiful *chatoyant* and golden reflections, and is usually of greyish-blue colour. It is found in Canada, Norway, and Sweden, and on the coast of Labrador, whence it was originally brought, and hence derives its name. It occurs also in the Oriental verde antique of Greece, and in porphyries. From its play of colour and *chatoyant* reflections it is sometimes used in jewellery for ornamental purposes, and also for carving grotesque heads in relief.

### Obsidian.

It consists in general of 80 silica, 10 alumina, with various minor percentages of potash, soda, lime, oxide of iron. It is a volcanic glass of various colours, but usually black or greenish-black; a green variety occurs in California. The principal localities in which it is found are Iceland, Siberia, Hungary, New Zealand, New Caledonia, Ascension, Teneriffe, the Lipari Islands, Mexico, Peru, Madagascar, South Sea Islands, Melos, and other islands in the Grecian Archipelago, California, and N.W. America.

It is remarkable for its perfect conchoidal fracture, and for its sharp, cutting edges, advantage of which was taken by the ancient Mexicans, the inhabitants of Teneriffe, and other primitive races, who made it into arrow-heads, knife-blades, razors, &c. The ancient inhabitants of Mexico, and also the Romans, made mirrors of obsidian, and sometimes used it as a gem.

### Agalmatolite.

A silicate of alumina and potash. Its usual colour is white or red, or both colours intermingled in bands and

patches. It is also called figure-stone, pagodite, and is brought from China, carved into grotesque figures and seals. It is distinguished by its chemical composition from steatite, which always contains magnesia, but no potash.

### Steatite.

A silicate of magnesia, of various tints of white, grey, yellow, green, and red. It has generally a soft and unctuous feel, and yields to the nail, but does not adhere to the tongue. It is also called soapstone. The white variety is carved into beautiful ornaments at Agra, in India.

### Selenite.

A hydrated sulphide of lime, a translucent variety of gypsum. It is frequently used for ornamental purposes for necklaces, bracelets, &c.

### Turquoise.

A phosphate of alumina, tinted with phosphate of iron, and phosphate of copper, of a beautiful sky-blue. It occurs reniform, stalactitic. This is the true turquoise de la vieille roche, the Oriental or mineral kind. The best comes from Persia, from the mines of Ansar, near Nishapur, in Khorasan. It has also been found in Arabia Petræa. It takes a fine polish, and is much employed in jewellery, cut in low cabochon. It is much used in Oriental countries for ornamenting swords, daggers, cups, &c. This stone is very liable to lose its colour under the action of alkalies, such as are contained in soap, or even by exposure to the light and the action of the air. The Mexicans had also a turquoise which they used, as the Persians have always done, to ornament objects in clustered masses. There is also a green variety.

According to Mr. Eastwick, in the Persian Treasury is the finest turquoise in the world, three or four inches long and without a flaw.

### Odontolite.

Odontolite, or turquoise de la nouvelle roche, also termed occidental, or bone turquoise, appears to be bone or ivory coloured by oxide of copper. It is found in Languedoc. The colour is generally fine, but of an inky-blue, which is never seen in the Persian turquoise. Its texture is very compact.

# PRECIOUS OPAL.

Opal is a hydrate of silica, consisting of from 90 to 95 of silica, and 5 to 10 of water. There are several varieties. The most highly prized is the noble or precious opal, which exhibits a rich play of prismatic colours, which flash from minute fissures apparently striated with microscopic lines, due it may be to lamina, formed by incipient crystallization. The colour is not due to any colouring matter, but is in consequence of the diffraction of the light produced by these fine lines. When held between the eye and the light it appears of a pale red and wine-yellow tint, with a milky transparency. By reflected light it displays the most beautiful iridescent colours, green, yellow, red, blue, violet. It is always cut with a convex surface. Fine stones are extremely rare, and seldom large. This variety is called the Harlequin opal. Golden opal is a term applied to that variety in which only one colour, an orange-yellow, is present. The common varieties do not exhibit the peculiar play of colours termed opalescence. They are sometimes made into pins, cane-heads, and other ornaments.

The finest opal of modern times was the Empress Josephine's, entitled the "Burning of Troy," from the innumerable red flames blazing on its surface, the reverse being perfectly opaque.

The largest opal known is in the Imperial Cabinet of Vienna. It is the size of a man's fist, and weighs seventeen

ounces, but is full of fissures. Good specimens may be seen in the Townshend Collection, S.K.M.

The opal is found in Hungary, Mexico, and Honduras, and in small rounded pieces in sand, in Ceylon.

### Fire Opal

Is a rich hyacinth-red variety of opal, from Mexico. It is also called Girasol and Sun opal. A fine specimen is in the Beresford Hope Collection, S.K.M.

### Hyalite.

A semi-transparent variety of opal, occurring in small reniform, botryoidal forms, resembling glass.

### Hydrophane.

A variety of opal of a dull appearance, but which when immersed in water acquires all the opalescent tints of the precious opal. It is also of an opaque yellow, which when moistened becomes quite transparent. It adheres to the tongue. Its name is derived from ὕδωρ, water, and φαίνω, to appear.

### Cacholong.

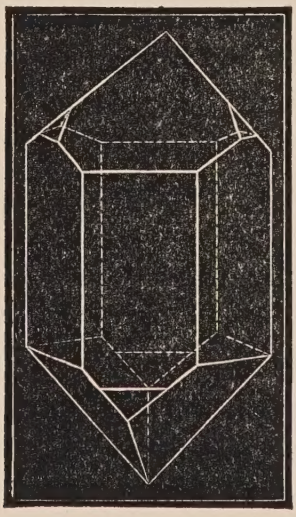
A variety of opal, so called from its being found in great beauty on the borders of the River Cach, in Bucharia. It is nearly opaque, of a milky or bluish-white colour, dull exteriorly, but with a somewhat pearly lustre within. It is sometimes found associated with hydrophane.

### Matrix of Opal.

A porphyry containing minute veins of opal, running through it. Snuff-boxes and other ornaments are made of it.

## Rock Crystal.

This colourless variety of vitreous quartz consists of pure silica crystallized. It is very common in granite and other rocks and veins, in the shape of rock-crystal, presenting itself in six-sided prisms, terminating at one or both ends in six-sided shining pyramids. It scratches glass, and is harder than felspar, but is not so hard as topaz. It is



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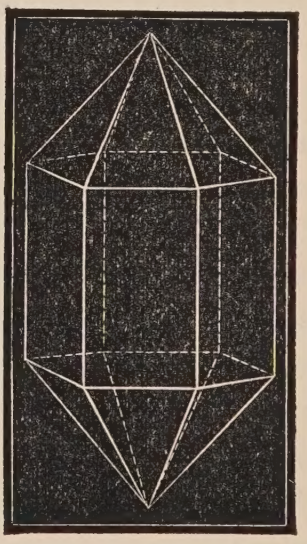

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found in various localities in almost every part of the globe; in the East Indies, Ceylon, Brazil, in several parts of England, Ireland, Scotland, where the crystals are called diamonds, such as Bristol diamonds, Isle of Wight diamonds, Irish diamonds. It is employed for ornamental purposes. In India it is cut into cups, vases, some elaborately carved.

## Amethyst.

Quartz, or rock crystal, coloured by a minute portion of iron and manganese. It is a transparent stone of a purple

or violet colour. The finest amethysts are brought from India, Persia, Ceylon, Brazil, and Siberia. It is also found in Ireland. It is chiefly used for brooches and other ornamental purposes. The deep purple-coloured specimens are frequently called Oriental by jewellers, to be distinguished from the true Oriental amethyst or violet sapphire.

### Yellow Crystal.

This variety of quartz is sometimes called false topaz. The wine-coloured variety is called Cairngorm, after the name of the mountain in Invernessshire, where it is found. It is frequently used for ornamenting the handles of dirks, powder-horns, snuff-boxes, and other articles belonging to Highland costume. This yellow variety is found in every part of the world, in Brazil, Switzerland, Siberia, India.

The deep-coloured crystals found in Brazil are called cinnamon-stone, the French term being "pierre de cannelle." A fine kind is also found in Spain, of a dark yellowish-brown, which when heated becomes light-coloured, and assumes a fine orange tint.

### Blue Crystal.

Water-worn pebbles of crystal, of a beautiful blue colour, are found in France in the stream of Rioupezzouliou, near Expilly, in Auvergne: they have been called saphirs de France, or saphirs de Puy-en-Velai.

### Rose Quartz.

A transparent variety of quartz of a rose-red or pink colour, probably produced by manganese. It is sometimes employed in jewellery. When cut and polished, and of good colour, it is sometimes sold for spinel. It is found in

Rabenstein, in Bavaria, in a vein of manganese traversing granite, in France, in Finland, and also in Scotland and Ireland.

### Citrine.

A variety of crystal of a lemon-yellow colour.

### Smoky Quartz.

Crystals of quartz of a brown or smoke-coloured tint. It is also called morion.

### Iris.

The name applied by French jewellers to a variety of rock crystal, possessing the property of reflecting the prismatic colours by means of natural flaws in the interior of the stone. It may be produced artificially by dropping crystals suddenly into boiling water, or by heating and suddenly dropping it into cold water. The Empress Josephine possessed a suite of ornaments made of this stone.

### Rubasse.

A name given by French lapidaries to a variety of rock crystal with rose-coloured cracks. These fissures are artificially produced by heating the crystal red-hot and then plunging it into a solution of purple of cassius, or carmine.

### Avanturine.

A translucent variety of vitreous quartz of reddish colour, and containing minute yellow spangles of mica. It is found in India, Bohemia, Cape de Gata, in Spain, and in Siberia. Many ornamental articles are made of it. An artificial variety of it is made at Venice. It was discovered by

chance (*par avantura*), a workman having accidentally let fall some brass filings into a pot of melted glass. The name has been derived from this.

A beautiful green variety is found in India, which is sometimes used for glyptic purposes. In the collection of Dr. Wise is a lingam of green avanturine, with the head of Siva carved on it.

### Prase.

A dull but hard green impure translucent variety of vitreous quartz, the colour of which is caused by an admixture of amphibole. It seems seldom noticed, but the name is very frequently confounded by some writers with plasma, a green chalcedony. It is found in the iron-mines of Breitenbrunn, near Schwartzenberg, in Saxony, and on the Harz.

### Chalcedony.

Pure chalcedony is a most intimate mixture of silica in the two states of quartz and opal, and in variable proportions. It is colourless, or a very pale horn colour; but tinted with small quantities of iron and other substances it forms a brilliant, endless variety of sards, agates, cornelians, plasmas, &c.

### White Carnelian

Is the milk-white variety of chalcedony.

### Sapphirine.

A name applied by lapidaries to chalcedony of a blue tint.

Another variety of chalcedony is that of a yellow colour. Opaline is a term sometimes applied to a variety of yellow chalcedony which presents an opaline semi-opacity.

### Carnelian.

The red variety of chalcedony. Its colour ranges from a clear bright red tint to a deep reddish-brown. The colour is due to the presence of iron. The Occidental variety, so named to distinguish it from the Oriental variety, or sard, is generally of a dull red, and is deficient in the rich hues of the latter stone. It is susceptible of a high polish, and for that reason, and the brightness of its colour, it has always been a favourite substance, much used for seals, brooches, rings, necklaces, &c. It is found in Bohemia, Saxony, and in Scotland. The name is derived from *carneus* (from *caro*, flesh) in allusion to its colour.

### Sard.

The name sard is only applied to the Oriental variety of carnelian, or red chalcedony. The sard, when in its perfection, is of a full, rich reddish-brown colour, and when held between the eye and the light exhibits a deep ruby colour, approaching to cherry red, or blood red. The French term the deep brownish-red variety of this stone, almost inclining to black, *sardoine*, calling the red alone *cornaline*. The finest sards come from Cambay and Surat in India. They are also found in Arabia. The sard was much used by the ancients for intagli.

Cornaline de vieille roche, is a name given by lapidaries to the clear, transparent Oriental variety of carnelian of a dark red colour, and held in most esteem in consequence of the richness of its colour, and its hardness, which renders it susceptible of a high polish. It is found in the older rocks, and is chiefly brought from Surat, in India.

### Onyx.

A variety of chalcedony in alternate stripes of black and

white. The name is more especially applied to the strata of agate, when cut in only two parallel horizontal layers, the white being uppermost. There are two varieties of onyx, the Oriental and the Occidental. The Oriental is of a fine texture, and extremely hard. It generally comes from India. The Occidental variety, especially that from Oberstein, is softer than the Oriental. The finest onyxes, from the earliest times, came from India, principally from Broach, near Cambay, and from Malwa; the greater number at the present day come from Uruguay, in Brazil, and are worked up into ornamental stones at Oberstein. These are mostly all artificially coloured. The word onyx is derived from ὄνυξ, *a nail*, because it has a white in it resembling that in the nail of a man's finger. (Pliny.)

### Sardonyx.

A variety of chalcedony consisting of alternate parallel layers of white and red chalcedony, and in some instances of more than two layers, when an upper brown one is introduced. When used for the purposes of art, it is so arranged that the white layer is over the red, or sard. The Oriental variety is most prized, and was the only kind used by ancient artists; the Occidental variety is that generally adopted for camei, or ornaments at the present day.

This variety of onyx has been defined by Pliny as presenting a white layer over one of sard (candor in sarda), like the human nail over flesh.

### Chalcedonyx.

A variety of chalcedony, with alternating layers of white and grey, the white being uppermost when used for camei.

### Agathe-Onyx.

Agathe-onyx is a name given by the French to that variety in which the upper layer is opaque and white, the lower transparent, and either colourless or a pale yellow. This is the material most frequently employed for modern carving, and is often termed the German onyx, where the ancients preferred almost exclusively for that purpose the opaque and rich-coloured strata of the Indian sardonyx.

### Nicolo.

A variety of onyx so called, when the lower layer is black, and the upper one of a bluish tint. When used for intagli, the design is cut through the upper layer to the lower one. It generally exhibits a bevel edge. The name nicolo is from the Italian word *onicolo* (a little onyx).

### Banded Agate.

When an agate is so cut that the layers run across the face of the stone it is termed "tri-coloured," or banded agate. It was a favourite stone of the Italo-Greek engravers.

### Jasper Onyx. Jasper Agate.

These are varieties in which one or more of the layers of the agate are formed of a coloured jasper.

### Plasma.

A leek-green translucent chalcedony, possessing a waxy lustre, and sometimes exhibiting small black spots. The stone used by ancient engravers came from India; at the present day it comes from Schwarzwald, near Baden; Hauskopf, near Oppenau. Many antique intagli occur in this stone.

The word plasma is an Italian corruption of prasius or prasina. It is called by the Italians *plasma di smeraldo*, or prasma. This stone is not to be confounded with prase, a dull green vitreous quartz, a mistake frequently made by some writers of the present day.

### Heliotrope.

A translucent green chalcedony, or plasma with red spots. The finest kind comes from India.

### Agate.

Agates are mixtures in alternating layers of various varieties of chalcedony. They have been usually formed by infiltration of siliceous waters into cavities in trap-rocks, and the layers in the agate mark the successive and often concentric walls of the cavity as from time to time new deposits were formed in the interior. In amygdaloid they are mostly found in the form of hollow balls or geodes, coated inside with quartz or amethyst. The hardest and finest-coloured are those of India and Uruguay, in Brazil. Softer agates are found in Germany, and in other localities. The finest varieties are termed Oriental. From these stones, the onyx, sardonyx, are produced when cut in parallel horizontal layers.

The best Indian agates, Mr. Forbes tells us,[9] are found in peculiar strata, thirty feet under the surface of the earth, in a small tract among the Rajpipla hills, on the banks of the Nerbudda; they are not to be met with in any other part of Guzerat, and are generally cut and polished in Cambay.

"In the neighbourhood of Broach, nodules of agate are

[9] "Oriental Mems.," vol. ii. p. 20.

procured by sinking pits in the dry season in the channels of torrents. Their colour when recent is dark olive-green, inclining to grey. The preparation which they undergo is, first, exposure to the sun for several weeks, and then calcination. The latter process is performed by packing the stones in earthen pots, and covering them with a layer five or six inches thick of dried goat's-dung. Fire is then applied to the mass, and in twelve hours the pots are sufficiently cool to be removed. The stones which they contain are now examined, and are found to be some of them red, and others nearly white, the difference in their respective tints depending in part on the original quality of colouring matter, and in part, perhaps, on the difference in the heat to which they have been exposed."[1]

Immense quantities of agates are obtained from Uruguay, which are cut and polished at Oberstein, in Rhenish Bavaria, whence they are exported to all parts of the world.

Agates are also found at Oberstein, and in Scotland.

Sicily furnishes a variety of agate mottled with yellow and white, and red and white. It never occurs in layers or stripes.

The colours of agate, when indistinct, may be also increased, by steeping first in oil or honey, and afterwards boiling in sulphuric acid, which turns the carbon of the oil or honey absorbed by this stone to a light or dark brown, or black, according to the quantity that has penetrated, which is in proportion to the more or less porous nature of the stone or parts of the stone.

The sard or red tint is produced by soaking the colourless grey chalcedony in a solution of nitric acid, water, and iron, and then heating it to turn it into red.

[1] Jamieson's "Mineralogy," vol. i. p. 255.

These practices are adopted at Oberstein, in Germany, at the present day.

These stones are much employed in a polished state for ornamental articles, as brooches, bracelets, beads, seals, paper-knives, &c. All these articles, sold at watering-places in different parts of England, are made from agates, which come from Brazil, but which are cut and polished at Oberstein, in Germany. Sicilian agates are frequently used for handles of knives and ornamental purposes. The churches in Sicily are profusely ornamented with them.

Lapidaries have given distinctive names to the numerous varieties of the agate; such as, moss agate, ribbon agate, eye agate, fortification agate, zoned or banded agate, variegated agate, brecciated agate, mocha stone.

Moss agate is that variety which encloses dendritic or moss-like markings of various shades.

Ribbon agate is so called, when the layers are nearly straight and parallel.

Eye agate is a term applied to those small kinds of circle agate, which show a dark spot in the centre. It is much prized in India.

Fortification agate, when the layers are zigzag, from its general resemblance to the outline of a fortification.

Zoned or banded agate, when the stone is so cut that the layers, usually dark and white, run across the face of it. It is sometimes styled tri-coloured.

Brecciated agates consist of fragments of jasper, bloodstone, cornelian, &c., cemented by a paste of chalcedony.

Mocha stone is a translucent variety of chalcedony, containing brown and black markings resembling trees and plants, occasioned probably by the infiltration of iron or manganese. It is found in Arabia, whence the name mocha

stone. Others say it is a corruption of moschos (or moss) stone.

The name agate is derived from that of the river Achates, in Sicily, where, according to Theophrastus, agates were first found.

### Cat's Eye.

A variety of chalcedonic quartz, usually of a yellowish-greenish colour, sometimes hyacinth red, olive green, and blackish. When cut *en cabochon* it displays a peculiar floating lustre, resembling the contracted pupil of a cat's eye when held to the light, which is supposed to be caused by the presence of small parallel fibres of asbestos. It is mostly used as a ring-stone. The finest kinds come from Ceylon and Malabar. It is greatly esteemed by the modern Hindoos, and a high value set on it. The largest known is in the Beresford Hope collection, S.K.M. It formerly belonged to the King of Candy. It is hemispherical, $1\frac{1}{2}$ inches in diameter. The Italian name for cat's eye is *bel-occhio*.

### Chrysoprase.

An apple-green variety of chalcedony, coloured by oxide of nickel. It is only found at Kosemuth, in Siberia. In France it is much used for seals, snuff-boxes, brooches, and ornaments.

### Jasper.

A compact variety of quartz, rendered opaque by a small proportion of alumina and iron. It is usually of a dull red, yellow, brown, or green colour, sometimes blue or black. A red jasper, of a vermilion colour, is found in a breccia in India, and also in Egypt. Pebbles of red jasper are found on the plains of Argos ; yellow jasper is found at Vourla,

in the bay of Smyrna. Red jasper is coloured by the peroxide; yellow and brown by the hydrate of iron; green jasper is coloured by a mixture of the green mineral chlorite.

When the colours are arranged in stripes it is called striped or ribbon jasper. A variety with stripes of red and green comes from Siberia, and another with stripes of yellow, red, and white from India.

Egyptian jasper occurs in the form of pebbles on the banks of the Nile, and is zoned with shades of brown, frequently spotted with black.

Sicily furnishes a fine variety of jasper, of which cups, tables, altars, even pillars and columns, are made.

Jasper is susceptible of a brilliant polish, and is manufactured into brooches, snuff-boxes, vases, knife-handles, and other ornamental articles.

The jasper (*jaspis*) is undoubtedly a word of Semitic origin. It is the Hebrew *jashpeh* (firm, tough), from *jashat* (to be strengthened), a derivation that derives some interest from the fact that nearly all the Semitic (Phœnician) gems we know are engraved on a chloritic green jasper, known as *jaspis* by Greek and Latin lapidaries.[2]

### Bloodstone.

A green jasper spotted with red spots. It is often used for seals. In the middle ages it was held in high esteem; as the red spots were supposed to be the blood of Christ. It is found massive in India, Bucharia, Tartary, Siberia. In Italy it is termed *jaspro sanguineo* (sanguineus jasper). This stone is often confounded with heliotrope, or green chalcedony with red spots.

[2] "Precious Stones," *Edinburgh Review*, July, 1866, p. 237.

### Porcelain Jasper, or Porcellanite.

A clay altered by heat, and often having the aspect of certain kinds of porcelain.

### Magnetite.

A magnetic iron ore, consisting of about 69 iron peroxide with 31 iron protoxide. It is of iron-black colour, with a metallic lustre; strongly magnetic, especially when massive. It is found in India, Hungary, Saxony, Siberia, France, and many other countries.

Babylonian cylinders are sometimes made of this stone.

### Hæmatite.

A peroxide of iron, opaque, of an iron-black colour with red streaks. It is found in France, Spain, Germany, Russia, and in many parts of England.

It is sometimes hard enough to take a very fine polish, and is thus used for polishing glass, gold, steel, and other metals.

It is distinguished from magnetite by its red streaks. Babylonian cylinders and intagli are frequently found of this stone.

### Marcasite.

White iron pyrites, or sulphuret of iron. It takes a good polish, and is cut into facets, like the rose diamond. In this state it possesses all the brightness of polished steel. It was formerly much employed for ornamental purposes, when it was made into shoe and knee buckles, and set in pins, bracelets, &c.

### Dioptase.

A silicate of copper, of an emerald green colour and of a

vitreous lustre. It occurs disposed in small crystals on quartz in the copper mines at Altyn Tübé, in Siberia. It has been sold for emerald by ignorant dealers. A specimen of this stone passed off as an emerald may be seen in the Geological Museum, Jermyn Street.

### Malachite.

Green carbonate of copper. It occurs in reniform, botryoidal, and stalagmitic masses in copper mines. Its colour is of various shades of green, from a light, bright green, to a dark opaque kind. Fine specimens are worked up into vases, snuff-boxes, and other ornaments. The finest variety comes from Siberia, about 100 miles south of Bogoslofsk. Fine specimens are also found in Australia, at Burra-Burra. The name is derived from μαλάχη, the *marsh-mallow*, on account of its resemblance in colour to the leaves of this plant.

### Azurite.

Blue carbonate of copper, of an azure blue colour. It generally occurs associated with malachite. It is also called chessylite, a name which has been given to it from Chessy, near Lyons, where it occurs in beautiful crystals.

# PEARLS.

Pearls are concretions of carbonate of lime found in certain shell-fish (avicula, ostrea, unio, pinna), and are formed of infinitely delicate layers of shell matter around some foreign body accidentally introduced into the shell (usually a grain of sand), for the purpose of preventing the irritation its roughness would otherwise occasion to the tender inmate.

They are found of different colours, white, yellow, pink, black.

The principal pearl-fisheries are in the east, on the west coast of Ceylon, in the Bay of Manaar, in the Persian Gulf. They also come from Panama and California.

They are much prized for ornamental purposes, and are generally worn strung as necklaces or in ear-rings.

The pearl necklace of the Empress of the French is one of the finest known. The necklace, presented to her Majesty by the East India Company is equally fine.

The largest known pearl, weighing three ounces, and set as a pendant, is in the Beresford Hope Collection, in the South Kensington Museum. It is pear-shaped, and measures 2 inches deep by $2\frac{1}{2}$ in circumference at the longer end.

The Shah of Persia has a pearl valued at 60,000*l.*

All the different varieties of the pearl, together with an example of the pearl-bearing oyster, exhibiting the pearl in the fish, may be seen at the South Kensington Museum.

## Amber.

A fossilized gum or resin found in irregular masses of all shades of yellow, from the palest primrose to the deepest orange, sometimes brown. Its lustre is resinous or waxy, and varies from transparent to opaque. The compositions are, carbon, 78·96 ; hydrogen, 10·51 ; oxygen, 10·52. It becomes negatively electric by friction. According to Goeppert, amber is the mineralized resin of extinct coniferæ, one of which he has named *Pinites succinifer*, or amber-bearing pine-tree.

Amber is found in abundance on the Prussian coast of the Baltic, from Dantzig to Memel, also on the coast of Denmark, in Sweden, Norway, Moravia, Poland, Switzerland, and in France. It is also found on the Sicilian coast near Catania, at Hasen Island in Greenland, and occasionally on the coast of Norfolk, Essex, Sussex, and Kent.

That found on the coast is distinguished as marine amber. The other description, called terrestrial amber, is dug out of mines, and is generally found in alluvial deposits of sand and clay, associated with fossil wood, iron pyrites, and alum shale.

Insects and other animals frequently occur enclosed in it. They appear to have been entangled in the viscous substance while alive. In the Beresford Hope Collection is a piece of amber in which is a small fish.

Yellow amber, cut in facets or simply in heads for bracelets and necklaces, was in fashion some years ago. At the present day it is chiefly used in the east by the Turks, Egyptians, Arabs, Persians, and the natives of India, to ornament their pipes, arms, the saddles and bridles of their horses. At the present day in Europe it is still used for the mouthpieces of pipes. The translucent yellow variety

is the rarest and the most prized by the Orientals. In the Museum of Mineralogy in Paris is the handle of a cane made of pure limpid yellow amber. The semi-opaque or "clouded" variety was much prized in England in the age of Pope and Gay.

### Jet.

A variety of lignite (fossil wood imperfectly mineralized), the colour is velvet black.

Jet is found principally in the amber mines on the coast of the Baltic, where it is known by the name of black amber, and in alum shale in the neighbourhood of Whitby in Yorkshire. It is there made into various articles, and is especially used for mourning ornaments.

### Coral.

Coral is a production secreted by marine asteroids, polypi, or zoophytes. It is composed of carbonate of lime, a little magnesia, and a very small percentage of oxide of iron. It assumes a peculiar plant-like form with numerous branches. It is found of several colours, red, pink, green, brown, and yellow, as well as white and black. The pale delicate pink is the most valued, and realizes a high price.

Coral is found in enormous reefs in the seas in many parts of the globe. That adapted for purposes of ornament comes almost entirely from the Mediterranean, and is found principally on the African coast.

At Naples and Genoa it is largely used for ornamental purposes, and is carved into bracelets, necklaces, beads, and charms against the evil eye.

### Fluor Spar.

A fluoride of calcium, consisting of 67·15 lime and 33·25

fluoric acid. It occurs chiefly in veins either crystallized in cubes, in granular crystalline masses, or compact and earthy. Its colours are various, the more common being violet blue, yellow, green, and purplish blue passing into red. The red tints are produced by exposing it to heat.

The finest specimens for ornamental purposes come from Tray Cliff in Derbyshire, and are called Blue John. It is also found in other parts of Derbyshire, and in Cornwall. It occurs, too, in Mont Blanc, St. Gothard, in Bohemia, and in Italy, in the Lombardian Alps. In Derbyshire it is largely manufactured into ornamental articles, tazzas, vases, &c.

Eight large blocks of fluor spar have been lately discovered at the Marmorata, the site of the ancient Emporium, on the banks of the Tiber, Rome, where they were evidently imported from the East, with other blocks of Oriental marble found there. This variety of fluor spar exhibits all the colours of the Occidental kind, violet blue, purple, green, red, with veins of white (hornstone) winding through it. A block of fluor spar was some years ago in the possession of a Roman dealer in antiquities of the name of Rolli, which he sold to the Jesuits, who had it cut up into thin slabs to form the front of the altar of their church, the Gesu. Rolli gave out he found it digging the foundations of a house, but it is now known he stole it from the Marmorata.[3]

[3] See article on "Murrhina." p. 124

# ANTIQUE GEMS.

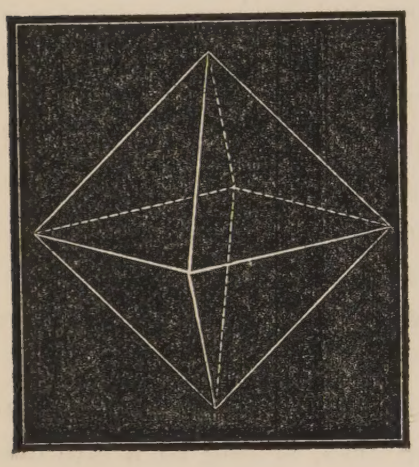
## Adamas.—Corundum.

The adamas of Pliny has been identified by many writers with the diamond, but we are inclined to adopt Professor Dana's opinion, that it is doubtful whether Pliny had any acquaintance with the real diamond.

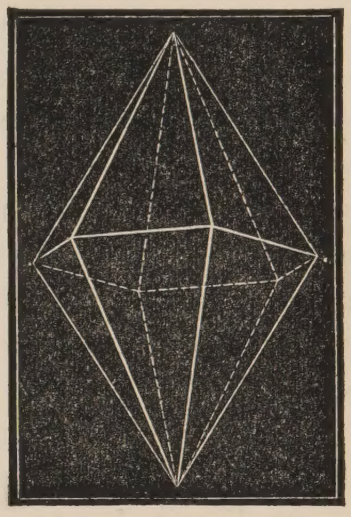
According to Pliny, "the Indian adamas appeared to have a certain affinity to crystal, being colourless and transparent, having six angles, polished faces, and terminating like a pyramid in a sharp point (*laterum sexangulo lævore turbinatus in mucronem*), or also pointed at the opposite extremities, as though two whipping-tops (*turbines*) were joined together by their broadest ends." This description correctly delineates the form of a crystal of corundum which is hexagonal, commonly occurring crystallized in six-sided prisms. It is also found in obtuse and acute double hexahedral pyramids (Pliny's *turbines*). It is generally found nearly colourless and transparent, but frequently with a bluish tint. The crystallization of the diamond, on the other hand, is octahedral, and hence it is evident it is not the stone described here.

The hardness of the adamas, Pliny says, is beyond all expression, owing to which indomitable powers it is that it has received the name which it derives from the Greek (α, not, and δαμάω, to subdue). The corundum is next in hard-

ness to the diamond. "These stones," he further says, "are tested with the anvil, and will resist the blow to such an



Octahedral crystal of Diamond.



Hexahedral crystal of Corundum.

extent as to make the iron rebound, and the very anvil split asunder." This, however, is not the case with diamond, as it is very brittle, and splits readily when struck with a slight blow in the direction of the plane of cleavage.

Pliny observes further on : "When by good fortune this stone does happen to be broken, it divides into fragments so minute as to be almost imperceptible. These particles are held in great request by engravers, who enclose them in iron, and are enabled thereby, with the greatest facility, to cut the very hardest substances known." Fragments of corundum, from time immemorial, have been used by Indian lapidaries for cutting and polishing the hardest gems. When first introduced, Mr. King tells us, into the European *atelier*, some ninety years ago, it was known by the name of adamantine spar.

"Some mineralogists," Mr. King writes,[1] "have advanced

[1] "Precious Stones," p. 42.

the paradox that the adamas of the Romans was not the diamond, but the sapphire. A sufficient answer to this is, that such large sapphires as the ancients frequently engraved (the signet of Constantius, for instance, weighing 53 carats) could not be termed *punctum lapidis*. And besides this the latter stone could not have been engraved by means of its own fragments. The sapphire, too, usually occurs in masses of considerable relative size, especially the grey sort, supposed, according to this theory, to represent the adamas, and these are found rounded and pebble-shaped ; of a form, in short, to be described by anything better than the term *punctum*."

Mr. King must be well aware that the signet of Constantius, and all other engraved sapphires, belong to a late date of the Empire,[2] and consequently after the time of Pliny, when, perhaps the true diamond was known. In Pliny's time the diamond was evidently unknown. The *punctum lapidis*, or sharp fragment of corundum, would have been enough for the purpose of engraving the stones then in use, such as onyx, sard, and other chalcedonic stones. Besides small crystals of corundum are frequently found, with sharp points, to which the term *punctum lapidis* may be well applied.[3] This Mr. King admits further on. "Before the introduction of the true diamond into Greece, sharp fragments of corundum, obtained from Naxos, served the same purpose: the name adamas was then, doubtless, confined to the blue and grey sapphires found in Cyprus, or to the opaquer crystals of corundum discovered in the emery mines. Such a stone, reduced to sharp fragments, would serve to cut into and excise the quartz gems, sards, agates,

[2] The engraved rubies also mentioned by Mr. King all date from a very late period of the Empire.

[3] A small crystal of corundum from Ceylon in the possession of the author readily scratches onyx.

jaspers, then in request as signets, with almost as much facility as the diamond itself." He also allows further on in a note, page 108, that the ancient *crusta adamantis* was a splinter of corundum, which is most probable.

Further, Mr. Maskelyne suggests that the Greek term *adamas* was originally derived from the Semitic name for a material (probably corundum, or massive sapphire), which Phœnician commerce brought from India.[4]

Pliny mentions other varieties of adamas, which were undoubtedly all white sapphires—the Arabian, those found in the mines of Æthiopia, between the temple of Mercury and the Island of Meroë, the Cenchrea, the Macedonian, the Cyprian. The diamond has never been found in Arabia. The Æthiopia mentioned by Pliny is in reality India, and Agassiz is of opinion that the "Temple of Mercury" means Brahmaloka, or Temple of Brahma. Crystals of corundum are still found in granite rocks on the coast of Malabar, in the Carnatic, and in Ceylon. The Cenchrea, which Pliny describes as about as large as a grain of millet in size, was doubtless a name applied to the small rolled pebbles of sapphire found in beds of streams. The Cyprian adamas, so called from its being found in the Island of Cyprus, and to which *aerius* colour was applied, shows it to be a sky-blue sapphire.

Next in succession he mentions siderites, "a stone which shines like iron, and is more ponderous than any of the others, but differs in its properties from them all." Mr. Maskelyne identifies this stone with magnetite, the heaviest and hardest ore of that steel to which, doubtless, the title of adamas was originally vaguely applied.

The adamas of Theophrastus was in all likelihood the emery stone, an amorphous form of corundum.

[4] *Edinburgh Rev.*, July, 1866, p. 237.

In the Periplus of the Red Sea we read, "to Barace (Barcellore) are brought various and numerous kinds of lustrous gems, the Adamas and the Hyacinthus." The first here is doubtless the corundum, or white sapphire, and the second the blue sapphire.

Rings exist of Roman workmanship in which the diamond is set in its original octahedral form, unpolished, save with its natural somewhat resinous lustre, but evidently of a much later date than Pliny's time. The Hertz collection possessed a well-formed octahedral diamond, about a carat in weight, set open in a Roman ring. The Waterton Dactyliotheca furnishes a fine example of a diamond in its original setting, apparently dating from the Lower Empire. All these examples, however, date from a period long after Pliny's time.

CARBUNCULUS INDICUS. { The Male—The Ruby. / The Female—The Spinel.

In the first rank among flame-coloured stones Pliny places the carbunculus, so called from its resemblance to a red-hot coal. There are, he says, various kinds of carbuncles; of these, the most remarkable are the Indian and the Garamantic, each kind being subdivided into male and female, the former of which is of a more striking brilliancy, the brightness of the latter being not so strong.

The male variety of the Carbunculus Indicus we would identify with the ruby or red sapphire, which is remarkable for its bright colour and rich tints, and the female with the spinel ruby, a darker stone with less brilliancy.

The carbunculus garamanticus was doubtless the garnet.

From their not being affected by the fire, they were termed by the ancients, "acaustoi," a quality which applies exclusively to the ruby, as it is infusible.

Lessing and the Count de Clarac deny the existence of any really antique intaglio in this gem. Mr. King, however, enumerates a few works in ruby, of apparently indubitable antiquity. First, on account of the quality, a large oval, slightly convex stone of the true "pigeon blood tint," and weighing apparently about three carats in the Devonshire *parure*, engraved with a Venus Victrix—a but poor intaglio in the latest Roman manner. A full-length figure of Osiris, in half-relief, which seems a production of the Egyptian revival under Hadrian.

In spinel he cites a most splendid Gorgon's head (Praun), and a head of Pertmax, in his possession.

Nevertheless, Mr. King remarks, engravings in any of the Precious Stones are always to be received with the greatest suspicion.

True rubies, and of good colour, uncut, but with their natural surface rudely polished, occur, both inserted into pieces of antique jewellery, and set in rings dating from the earliest times.

### Hyacinthus.—Sapphire.

The hyacinthus of the ancients is generally supposed to be the sapphire of the modern. Solinus thus describes it. "Amongst these things (in Ethiopia), of which we have treated, is found also the hyacinthus of a shining *cerulean* colour; a stone of price if it be found without blemish, for it is extremely liable to defects. The best colour of the stone is an equable one, neither dulled by too deep a dye, nor too clear with over much transparency." A better description could not be given of the sapphire.

The description of the hyacinthus, by Pliny, would lead us to identify the stone mentioned by him, with the Oriental amethyst or violet sapphire. He thus describes it:—"Very

different from this stone (the amethyst) is hyacinthus, though partaking of a colour that closely borders upon it. The great difference between them is, that the brilliant violet, which is so refulgent in the amethystus, is diluted in the other stone."

On account of its extreme hardness, the ancients for the most part employed the sapphire as a mere ornamental stone for setting in their jewellery, unengraved and unshaped, contenting themselves with giving a tolerable polish to the native irregular surface of the pebble.

Most of the known antique intagli in sapphire are of a late Roman period.

In the Marlborough Collection are two most valuable as well as genuine examples of the sapphire, bearing antique intagli; one is a head of Caracalla. The intaglio is somewhat shallow, and is polished within to a singular degree of lustre. The stone is of a deep violet colour, and $\frac{5}{8}$ inch high by $\frac{4}{8}$ wide. The other is a Medusa's head, in front face, the treatment of the features, and the curling snaky tresses spirited to a degree, and every part most highly finished. This sapphire is of a fine sky-blue shade. But the most famous of all is the signet of Constantius II. (now in the Rinuccini Collection), on a perfect stone, weighing 53 carats.

Some good intagli on sapphire are in Mr. Maskelyne's Collection.

According to ancient writers, the word hyacinthus is derived from the name of a flower of a similar colour to this stone, but the received opinion at the present day is, that it is derived from the Persian *jacut*, ruby.

The iolite may have been classed by the ancients under the name of hyacinthus, as they were, perhaps, unable to distinguish between it and the sapphire. In Mr. Maske-

lyne's collection is a fine example of an iolite bearing the head of Berenice II. It was considered by its former owner to be a sapphire, and perhaps in ancient times also.

### Chrysolithus.—Yellow Sapphire.

"Ethiopia," Pliny says, "which produces hyacinthus (sapphire) produces chrysolithus also, a transparent stone with a refulgence like that of gold. The stones of India are the most highly esteemed." This stone is generally supposed to be the Oriental topaz or yellow sapphire, but as it is very rarely of a golden yellow, and usually of a pale straw colour, it may be the chrysoberyl, or Oriental chrysolite, a stone which is said to almost vie with the yellow diamond in lustre, polish, and colour.

The yellow jargoon, which is of a rich golden colour, may also put in a claim to be identified with the chrysolithus.

No genuine ancient intagli in any of these stones have been met with.

The only yellow stones, we believe, that have come down to us from antiquity are the pale citrine and yellow quartz.

The chrysolithus of twelve pounds mentioned by Pliny was doubtless yellow quartz.

### Astrion.—Star Sapphire.

The astrion, according to Pliny, is a stone resembling crystal in its nature, and is found in India. In the centre of it there shines a brilliant star, with the refulgence like that of the moon when full. "Some will have it," he says, "that this stone receives its name from the fact that when held opposite to the stars it absorbs the light they emit and returns it." No description can better suit the asteriated

crystals of sapphire, which exhibit a brilliant six-sided star in its centre.

Pliny further on writes: "Among the white stones there is one known as 'ceraunia,' which absorbs the brilliancy of the stars. It is of a crystalline formation, of a lustrous azure colour, and is a native of Carmania. Zenothemis admits that it is white, but asserts that it has the figure of a blazing star within." This is evidently the same stone, which frequently occurs of so pale a blue as to be almost white.

### Lychnis.—Balas Ruby.

Pliny mentions among the flame-coloured stones the lychnis, so called from its lustre being heightened by the light of the lamp, under which circumstances its tints are particularly pleasing. It is found in the same place where garnets occur, in the vicinity of Orthosia, throughout the whole of Caria, but the most approved stones are those of India, which last some have termed a carbunculus of milder tint. He then adds, "Between these last I find a difference noticed, one kind having a purple lustre, the other a red (cocco, kermes)." We may, we think, be justified in identifying the first with the almandine ruby, or violet-tinted spinel, and the latter with the balas, or rose-red variety of spinel.

Mr. King mentions in balas the head of a Bacchante, crowned with ivy, a masterpiece belonging to the best days of Roman glyptic art. The name ΕΛΛΗΝ appears in microscopic letters at the side.

### Asteria.—Cymophane.

"Next among the white stones," Pliny says, "is asteria, a gem which holds its high rank on account of a certain pecu-

liarity in its nature, it having a light enclosed within, in the pupil of an eye as it were. This light, which has all the appearance of moving within the stone, it transmits according to the angle of inclination at which it is held, now in one direction, and now in another. When held facing the sun it emits white rays like those of a star, and to this, in fact, it owes its name." This is undoubtedly the cymophane, or chrysoberyl cat's-eye, which exhibits as it were the pupil of an eye moving about within the stone, and when held facing the sun shows a pale opalescent ray on its surface.

### Smaragdus.—Emerald.

According to Pliny, the third rank in esteem (adamas being in the first, and pearls in the second) was given to the smaragdus.

"There is no stone," he says, "the colour of which is more delightful to the eye, for whereas the sight fixes itself with avidity upon the green grass and the foliage of trees, we have all the more pleasure in looking upon the smaragdus, there being no green in existence of a more intense colour than this.

"Of this stone," he continues, "there are no less than twelve different kinds: of the finest is the Scythian smaragdus, so called from the country where it is found. None of them has a deeper colour than this, or is more free from defects; indeed, in the same degree that the smaragdus is inferior to other precious stones, the Scythian smaragdus is superior to the other varieties. Next in esteem to this, as also in locality, is the smaragdus of Bactria. The third rank is held by the stones of Egypt, which are extracted from the hills in the vicinity of Coptos, a city of Thebais."

"All the other kinds are found in copper-mines, and

hence it is that, of these varieties, the smaragdus of Cyprus holds the highest rank." He characterizes the smaragdus of the copper-mines of Chalcedon as brittle, and of a colour far from distinctly pronounced, resembling in their tints the feathers that are seen in the tail of the peacock, or on the neck of pigeons. He also notices the smaragdi of Attica and of Media, and other inferior varieties.

In the opinion of Mr. Maskelyne, the first three, the Scythian, Bactrian, and Egyptian, were the true emerald; the Scythian coming no doubt from the Siberian locality near Bissersk, to the east of Ekatharinenberg; the so-called Bactrian most likely came from a locality unknown to us, to the north or north-east of the Hindoo-Coosh, possibly from the Altai, where, in the Tigeretz mountains, beryls are now obtained. The discovery of the emerald-mines at Mount Zabara, in Egypt, near the Red Sea, by Sir Gardner Wilkinson, with the houses almost intact in which the workmen formerly lived, establishes Pliny's Egyptian locality for the emerald.

Mr. King would identify the Scythian smaragdus, from its darkness and freedom from defects, with the green sapphire, or Oriental emerald. There may be grounds for this view, as the emerald from Siberia, with which Mr. Maskelyne connects it, is of a pale colour, very soft, brittle, and full of flaws. Others connect it with dioptase, a green silicate of copper, found in copper-mines in Siberia.

According to Mr. King, the smaragdi from Cyprus and Chalcedon were only crystals of transparent chrysocolla (a silicate of copper) still called the copper emerald. The chalco-smaragdus, from Cyprus, mentioned by Pliny, was doubtless the same stone. The inferior varieties of emerald mentioned by Pliny are regarded as plasmas, and jaspers of different shades of green.

The large smaragdi mentioned by Theophrastus were

most probably pieces of green jasper, while the colossal statue of Serapis, mentioned by Apion, was in some vitreous composition for which Alexandria was famous.

The musician Ismenias, in the reign of Alexander, having heard of a smaragdus engraved with an Amymone, on sale in Cyprus, at the price of six gold pieces, sent his agent for it, who by bargaining procured it for four pieces, at which Ismenias took offence, as he considered the value of the stone was lowered thereby. "But," Mr. King observes, "the locality, the age, and the comparative trifling cost of the stone, all go to prove that nothing more than a plasma is here understood by the term smaragdus."

Among the famous emeralds mentioned in ancient writers was the signet of Polycrates, an emerald with a lyre engraved on it by Theodorus of Samos.

True emeralds, Mr. King writes, with really antique intagli upon them, are amongst the rarest of the rare, and appear scarcely one of them referable to an earlier date than the age of Hadrian.

Mr. King enumerates a few examples of antique intagli in emerald, one of the Emperor Hadrian's head, another of his consort Sabina, and a third the heads of both facing each other. The Devonshire *parure* also exhibits (Bandeau, No. 11) a large and beautiful emerald cut into a Gorgon's head in high relief, which has every mark of being an antique work of the same period.

An intaglio head of the Solar Lion, the Alexandrian Cneph, in a stone of the finest colour, purity, and lustre, was in the late Fould collection. A bearded head of Jupiter, in an emerald $1\frac{1}{8}$ by $\frac{7}{8}$, is in the Duc de Luyne's collection, Paris.

In the possession of the author is a small emerald, with a lotus flower engraved on it. It is considered to be a

specimen of an emerald from the Egyptian mines, and perhaps the sole genuine example of an antique engraved emerald.

Pliny remarks when the surface of the smaragdus is flat, it reflects the image of objects in the same manner as a mirror ; and adds that the Emperor Nero used to view the combats of the gladiators upon a smaragdus. By holding the flat surface of the emerald in possession of the author, close to the eye, distant objects can be distinctly seen reflected in it. It thus confirms Pliny's statement, as the distinct reflection of distant objects on the slightly convex surface of the emerald must have been of great importance to a near-sighted person, as Nero was.

The name smaragdus is said to be the Greek form of the Persian *samarrud* or *zmeroud*.

### Beryllus.—The Beryl.

"Beryls," Pliny writes, "it is thought are of the same nature as the smaragdus. India produces them, and they are rarely to be found elsewhere. The most esteemed beryls are those which in colour resemble the pure green of the sea, the chrysoberyl being next in value, a stone of a somewhat paler colour, but approaching a golden tint." Pliny has here anticipated the modern discovery that beryls are of the same chemical composition as the emerald. Those which resemble the green of the sea are the modern aquamarine, and the chrysoberyl is evidently the yellow beryl, which is of a golden tint. The Indian locality of the beryl is Canjargum in the Deccan.

The beryl was seldom engraved on, and consequently genuine antique intagli are rarely to be met with. We may quote a few of the finest examples. The earliest is the Taras on the dolphin (formerly in the Praun collection, now

in Mr. Maskelyne's), the design of which is placed by Winkelman in the first class of Etruscan work. Amongst the best specimens of Roman date are the young Hercules,

Taras.

Julia, daughter of Titus.

Hercules of Gnaios.

inscribed ΓΝΑΙΟΣ, in the Blacas collection, and the aquamarine of the extraordinary magnitude of $2\frac{1}{2} \times 2\frac{1}{8}$ inches, engraved with the bust of Julia, the daughter of Titus, and signed by the artist ΕΥΟΔΟCΕΠΟΙΕΙ. It is in the collection of the Imperial Library at Paris.

### Carbunculus Garamanticus.—The Garnet.

The term carbunculus, being indiscriminately applied by the ancients to all red and fiery stones, comprises the several varieties of the garnet. The Greek synonymous word, as given by Theophrastus, is ἄνθραξ, a name signifying a live coal. He describes it as blood-red in colour (ἐρυθρὸς), but if held up against the sun assuming the appearance of a burning piece of charcoal.

The carbunculus garamanticus of Pliny is, doubtless, the

garnet. He divides it into male and female kinds, the first being the more brilliant, and finer in colour, and the latter being the duller varieties.

The garamantic, he tells us, has been also called the carchedonian, in compliment to the former opulence of Carthage (Καρχήδων).

The male and female kinds of the carbunculus garamanticus, in every probability, comprised all the varieties of the garnet, and the different colours, ranging from a brilliant red to the deeper and duller tints.

Pliny notes also the Æthiopian and the Alabandic stones, the latter of which are found at Orthosia, in Caria, but are cut and polished at Alabanda.

"The most highly-esteemed, however," Pliny says, "is the amethyst-coloured stone, the fire at the extremity of which closely approached the violet tint of the amethyst." This, undoubtedly, is the modern almandine garnet of a beautiful violet purple colour. The term almandine is said to be derived from Alabanda, where it was cut and polished in ancient times.

Next in value he notes "the syrtites," radiant with a wavy, feathery refulgence (*pinnato fulgore*,) an appearance which is sometimes to be seen in the interior of some red garnets.

The carchedonia, described by Pliny as of inferior value, and found in the mountains among the Nasamones, and of which Carthage was in former times the *entrepôt*, was, doubtless, a commoner variety of garnet. He says he finds it stated that in former times drinking-vessels used to be made of this stone, and adds, this kind offers the most obstinate resistance to the graver, and, if used for seals, is apt to bring away a part of the wax.

Pliny observes that the carbuncles of India admit of

being hollowed, and making vessels that will hold as much as one sextarius even.

In "Jamieson's Mineralogy," vol. i. p. 152, is the following passage, which confirms this:—"Crystals (of garnets) sometimes occur the size of a fist. These are cut into small vases, which are very highly valued, particularly if they are free from flaws, and possess a good colour, and considerable degree of transparency."

Mr. King tells us he has seen an antique cup, hollowed out of a single garnet, as large as a half goose-egg, which was engraved internally with the name of its ancient owner, Codrus. The inventory of the French crown jewels, drawn up in 1791, mentions "an oval cup of a single garnet, rich in colour, $3 \times 2\frac{1}{2}$ inches wide, and 3 high, valued at 12,000 francs (480*l.*)"

Pliny also says that "in some of the male carchedonian stones, there are luminous points like stars within;" these are, in all probability, the star garnet.

Garnets, Mr. King says, seem to have been little employed by the Greeks for engraving upon, but were largely in favour with the Romans of the empire, though not at a very early date. There are some rare instances of the almandine garnet being used by Greek artists, but from its great hardness the work on it is generally but rudely finished. Fine Roman intagli frequently, and sometimes imperial portraits, occur in the almandine, but no certain Greek, or early Græco-Roman, work is recorded in the blood-red garnet. At a late period the portraits of Sassanian kings frequently appear in the almandine. Some intagli are also met with in the guarnaccino or brown-red garnet.

The "Head of the dog Sirius," in the Marlborough Collection, is engraved on a perfect Indian garnet of unusual size and beauty. On the collar of the dog is

engraved ΓΑΙΟΣΕΠΟΙΕΙ. It is, however, of doubtful antiquity.

Many fine engravings, and also camei, occur in the essonite, and the hyacinthine garnet. The chryselectrum, which Pliny describes of the colour which inclines to amber, was probably the essonite, while the deep, rich-coloured stone—the hyacinthine garnet—was doubtless the *morio* of Pliny. The morio, he remarks, when of the colour of the carbunculus, is from Alexandria; when it shares that of the sard, is from the Cyprus. They are both, he adds, well adapted for carving in relief. We have some splendid examples among the finest gems of Græco-Roman artists in essonite and hyacinthine garnet. Among the most well-known in the hyacinthine garnet are the Julius Cæsar of Dioscorides, the Apollo Citharœdus, deeply cut, in a beautiful example of this stone: both are in the Blacas collection. In the Florentine collection is a fine head on a hyacinthine garnet cut *en cabochon*, representing the portrait of Philetærus, King of Pergamus. The Mæcenas of Apollonius, formerly in the Hertz collection, is in the same stone. A fine example is in the author's collection, carrying Laodicæa, as a female figure with her hand on the round pharos of the harbour of that town.

These latter stones have been frequently confounded by some writers and collectors with the hyacinth or jacinth (red zircon), and much confusion has arisen from this mistake. In some public collections also, antique camei and intagli in the hyacinthine garnet are ticketed as jacinths.

### Topazios.—Chrysolite.

Topazios, according to Pliny, is a stone that is held in very high estimation for its green tint. The name is said

to be derived from Topazos, an island in the Red Sea, whence the ancients procured these stones. The stone is considered to be indubitably our chrysolite—a greenish-yellow stone.

The most recent writers, according to Pliny, say that this stone is found also in the vicinity of Alabastron, a city of Thebais, and they distinguish two varieties of it—the chrysopteron (the chrysolite) and the prasoides (the peridot).

He adds further, "The topazios is the largest of all precious stones, and is the only one among those of high value that yields to the action of the file, the rest being polished by the aid of the stone of Naxos (emery). It admits, too, of being worn by use." The chrysolite is in reality of a very soft nature, and wears at the edges. Crystals of it sometimes occur of considerable size.

The modern topaz was totally unknown to the ancients.

### Topazios Prasoides.—The Peridot.

This stone, which Pliny describes as aiming at the exact imitation of the colour of the leek-leaf, is our peridot, of a yellowish green.

Some fine Greek intagli, Mr. King says, occur in peridot, to be ascribed from their style to the date of its first introduction at the Alexandrian Court, but they are of the highest rarity. The Romans appear never to have used the topazios prasoides for engraving on, deterred either by its softness, entailing the speedy destruction of the intaglio, or else by its high value as a precious stone. Modern works on it, on the contrary, are abundant enough, and to this class will the majority of supposed antiques in peridot, when critically examined, be found to belong.

A fine example of an intaglio in peridot, engraved by

Calandrelli, whose name is in Greek characters on the stone, may be seen in the Townshend collection, S.K.M.

### Chrysoprasius.—Green Jargoon.

Pliny mentions a stone of the name of chrysoprasius, closely allied to the chrysoberyl in its brilliancy, but of a more pallid colour, and thought by some to constitute a separate genus; he again describes it further on as similar in its green colour to the chrysopteron.

This stone may, perhaps, be the green jargoon, which is usually of a pale green tint, and remarkable for its brilliancy.

### Melichrysos.—Yellow Jargoon.

Melichrysos is described by Pliny as a stone which has all the appearance of pure honey seen through transparent gold. India produces these stones. This stone is probably the yellow jargoon, often met with in India. It is generally of a golden, honey-yellow colour; or it may be the yellow tourmaline, which comes from Ceylon.

### Lyncurium.

"The pertinacity," Pliny writes, "that has been displayed by certain authors compels me to speak of lyncurium; for even those who maintain that it is not a variety of amber still assure us that it is a precious stone. They assert, too, that it is the product of the urine of the lynx and of a kind of earth, the animal covering up the urine the moment it has voided it, from a jealousy that man should gain possession of it, a combination which hardens into stone. The colour of it, they inform us, like that of some kinds of amber, is of a fiery hue, and it admits, they say, of being engraved. They assert, too, that this substance

attracts to itself not only leaves or straws, but thin plates of copper even or of iron, a story which Theophrastus even believes, on the faith of a certain Droiles. For my own part, I look upon the whole of these statements as untrue, and I do not believe that in our time there has ever been a precious stone seen with such a name as this."

I may here adopt Pliny's words, and say that the pertinacity of some writers, in persisting to identify lyncurium with the hyacinth, or jacinth, has compelled me to notice it here. They seem to keep totally out of view Pliny's express belief that in his time there was no stone with such a name. Theophrastus certainly mentions lyncurium as a stone, but it was undoubtedly amber, for Pliny states elsewhere that lyncurium was a name given to amber by Demostratus, who tells the same absurd myth about the origin of amber as Theophrastus and other writers have told of the origin of lyncurium.

This misconception with regard to lyncurium may have arisen from Theophrastus terming amber a stone (λίθος).

The true hyacinth, or jacinth, was undoubtedly unknown to the ancients, as no antique gems of that stone have hitherto been discovered; besides the hyacinth is generally found of too small a size for the purpose of an engraved gem, and it is also too hard to engrave.

The so-called hyacinths, or jacinths, in collections of gems, or in descriptive catalogues of antique intagli, are in reality hyacinthine garnets.

## Sapphirus.—Lapis Lazuli.

Sapphirus, Pliny says, is refulgent with spots like gold. It is of an azure colour, though sometimes, but rarely, purple; the best kind comes from Media. Theophrastus

describes Sapphirus as spotted with gold-dust, and Isidorus says, "Sapphirus cæruleus est cum purpura, habens pulveres aureos sparsos." These descriptions answer to our lapis lazuli, through which are frequently disseminated particles of iron pyrites, bearing a great resemblance to gold.

The principal supply of lapis lazuli at the present day is from Persia and Bokhara, to which, doubtless, the Media of Pliny may be extended.

Lapis lazuli abundantly occurs in Egyptian jewellery, worked into signet-tablets, pendants, and charms. It was rarely used for cylinders by the Assyrians, though some fine examples do exist. Greek work on this stone is extremely uncommon, but intagli and camei of the Roman times are frequent in this material. In the Blacas collection is a head of Perseus, king of Macedon, in lapis lazuli. It was largely employed by the Persians under the Sassanian dynasty for regal portraits and seals.

With the Italians of the Cinque Cento it was an especial favourite, particularly for vases and for miniature busts and small relievi.

### Solis Gemma.—Moonstone.

The description of the solis gemma given by Pliny as "white, but diffusing brilliant rays in a circle, after the fashion of that luminary," appears to suit the Adularian felspar, known as the moonstone, from the silvery radiancy of the large orb that illumines its convex surface.

### Selenites.—Adularia.

Pliny's selenites appears to be a variety of adularia "white and transparent, with a reflected colour like that of honey. It has a figure within it like that of the moon, and reflects the face of that luminary, if what we are told is

true, according to its phases." It may be, however, our selenite, a crystallized sulphate of lime, the thin laminæ of which reflect the disk of the sun or moon.

The plates of this substance were split, and employed by the ancients for the lights of windows.

### Sandastros (male).—Sunstone.

According to Pliny, there were two stones of the name of sandastros, the one male, and the other female; the first of which he describes as "having all the appearance of fire, placed behind a transparent substance, it burning with star-like scintillations within that resemble drops of gold, and are always to be seen in the body of the stone, and never upon the surface. It is found in India." We can have no hesitation in connecting this stone with sunstone, a variety of adularia (ortholase felspar) of a pale yellow colour, and which appears full of minute golden spangles, owing to the presence of scales of oxide of iron disseminated through it. Examples of it come from Ceylon.

### Chrysoprasius.—Amazon Stone.

Chrysoprasius is described by Pliny "as similar in tint to the colouring matter of the leek, but varying in colour between topazios and gold. It is found of so large a size as to admit of cups even being made of it, and is cut into cylinders very frequently."

This stone was evidently an opaque stone, from its being associated with prasius, and is not to be confounded with the other chrysoprasius, mentioned before, and which was remarkable for its brilliancy, and consequently must have been a transparent stone.

We would venture to identify this stone with Amazon stone, which is brought from Lake Baikal in Siberia, and

is sometimes found in pieces sufficiently large to be made into small vases and other ornaments;[5] and lately fragments of a pedestal either of a statue or a column sculptured of this stone has been discovered in the ruins of the villa of M. Vopiscus at Tivoli.

The eumithres, which was "called by the Assyrians the gem of Belus, and which was of a leek-green colour, and greatly in request for superstitious purposes," was evidently the same stone. It was frequently used by the Assyrians for cylinders. The signet of Sennacherib in the British Museum is of this stone.

The modern chrysoprase, a green chalcedony coloured with oxide of nickel, was not known to the ancients. It is only found in Silesia.

### Nilion.—Jade.

India, according to Pliny, produces nilion, a stone which differs from chrysoprasius in its dull, diminished lustre. "According to Juba," Pliny says, "Æthiopia produces it, upon the shores of the river known to us as the Nilus ; to which circumstance, he says, it owes its name." According to Sudines it is to be found also in the Siberus, a river of Attica.

This stone, in all likelihood, may be the well-known stone jade, or nephrite, which is generally of a dull opaque green. The localities which Pliny mentions, where nilion is found, correspond with those where jade occurs. It is largely employed in India for ornamental purposes. It is also found in Egypt.

Axes, and some smaller implements of jade have been

[5] According to Castellani (Gems, p. 29), Caire speaks of a beautiful antique vase, made of Amazon stone, and which he saw in Florence.

discovered by Mr. Finlay in Attica ; made, doubtless, from that which occurs in the river Siberus.

Among Roman antiquaries jade is termed *pietra d'Egitto*.

### Tanos.—Jadeite.

Pliny describes a stone which is "included among the smaragdi, and known as 'tanos.' It comes from Persia, and is of an unsightly green, and of a soiled colour within."

Theophrastus calls this stone a pseudo-smaragdus. We would connect it with jadeite, a translucent variety of zoizite, held among the most precious substances in China and throughout the East. The Chalchituitls (jadeite) found in Mexico, and so much prized by the Aztecs, was considered by the Spaniards to be an inferior emerald (*baja esmeralda*).

### Callais.—Turquoise.

Callais, Pliny says, "is like sapphirus in colour, only that it is paler and more closely resembling the tint of the water near the seashore in appearance." This we have every reason to conclude was the turquoise of the present day.

In the Marlborough Collection is a cameo of great rarity; a small portrait of a Greek prince in a turquoise beautifully azure.

Antique intagli in this stone are said not to exist, except a few examples in the Sassanian class. The Renaissance artists employed it largely for small heads *en ronde bosse*, and also for camei. All the small works in turquoise, usually regarded as antique, may be considered to have their origin from them.

### Callaina.—Green Turquoise.

According to Pliny, the stone known as callaina is of

a pale green colour. It is found in the countries that lie to the north of India, among the Phycari, who inhabit Mount Caucasus, the Sacæ and the Dahæ. It is remarkable for its size, but is covered with holes and full of extraneous matter; that, however, which is found in Carmania is of a finer quality, and far superior. It is only amid inaccessible rocks that it is found, protruding from the surface, like an eye in appearance, and slightly adhering to the rock. The best of these stones have the colour of smaragdus. The finest of them lose their colour by coming in contact with oil, unguents, or even undiluted wine ; whereas those of a poorer quality preserve their colour better.

This stone has by most writers been identified with the green variety of turquoise, on which the Romans set the highest value. Turquoise is still found in large quantities in a mountainous district of Persia, not far from Nishapur, in Khorasan, where it occurs in veins which traverse the mountain in all directions. The identity of callaina with this stone is further confirmed by the remark of Pliny that it loses its colour by coming in contact with oil or grease, for turquoise loses its colour by contact with oil or grease, or when kept near musk or camphor, and also from dampness.

"The very rare antique works in turquoise," Mr. King says, "which have come down to us, are all executed in the green sort, the principal being the bust of Tiberius (Florence), the head as large as a walnut, sculptured in full relief; and the busts of Livia and the same emperor as a child, in half relief, on a stone of much larger dimensions (Marlborough Collection). A mask of the Indian Bacchus in front face, of a large green turquoise, is in the Blacas Collection.

The Mexicans also used green turquoise for ornamental

purposes. In the Christy Museum is a mask formed out of part of a human skull, coated with mosaic work, consisting chiefly of turquoise and obsidian.

The ἐλέφας ὀρυκτὸς, or fossil ivory of Theophrastus, is, probably, the odontolite, or bone turquoise *de la nouvelle roche*. The word μέλαινα, applied to it by Theophrastus, evidently means deep blue, as Dr. Hill suggests, as he applies a similar word to sapphirus or lapis-lazuli.

### Opalus.—Opal.

"Of all precious stones," Pliny says, "it is opal that presents the greatest difficulties of description, displaying at once the piercing fire of carbunculus, the purple brilliancy of amethystus, and sea-green of smaragdus, the whole blended together, and refulgent with a brightness that is quite incredible. India is the sole parent of these precious stones. This stone, in consequence of its extraordinary beauty, has been called 'pæderos' (lovely youth), by many authors; and some who make a distinct species of it say that it is the same as the stone that in India is called *sangenon*. These last-mentioned stones, it is said, are found in Egypt, also Arabia, and of very inferior quality in Pontus." Pliny mentions also, as being in existence in his time, a stone of the size of a hazel nut, on account of which Antonius proscribed the senator Nonius. On being proscribed, Nonius took to flight, carrying with him, out of all his wealth, nothing but that stone, the value of which was estimated at vicies H.S., 20,000*l*. of our money.

There can be no doubt of this stone, described by Pliny, being the opal of modern times.

"Some mineralogists," Mr. King writes, "doubt the fact that any region of the East Indies ever produced the true, merely because no such gem is now brought from

thence; but the same argument applies here as in the case of the true emerald, not at this moment found in that country, formerly the principal source of the stone."

"The precious opal," Mr. Maskelyne says, "is so rare a stone, that with our mining enterprise and geological research over the far vaster world of modern geography, we know of only two certain localities for it, in Hungary and Mexico." It is said, however, to be found in small rounded pieces in sand, in Ceylon, whence probably the Romans obtained it.

Mr. Maskelyne mentions a quartz in the trap rocks of the ghauts above Bombay, which sometimes shows an iridescence on certain of its crystal plains that seems to be due to the presence of this kind of opal. This may be the *sangenon* of India. The stones of Egypt and Arabia are likely to be of a similar substance.

"From its enormous value," Mr. King writes, "as well as on account of its fragile nature, the opal must have been rarely submitted to the skill of the Roman engraver, for the earlier Greeks were totally unacquainted with the gem." Hence Professor Urlicks justly pronounces unique the opal of the (former) Praun Collection, engraved with the head of Sol between those of Jupiter and Luna. The somewhat debased style," Mr. King remarks, "shows it to be a work of the Lower Empire." Another magnificent opal, though corroded by time, set in a cabalistic ring of the thirteenth century, is now in the Braybrooke Collection.

### Mithrax.—Matrix of Opal.

The mithrax, which Pliny tells us comes from Persia and the mountains of the Red Sea, a stone of numerous colours, and reflecting various tints when exposed to the sun, may be identified with the matrix of opal, which

exhibits various opalescent tints, from the veins of opal running through the porphyry stone.

### Anthracitis.—Hydrophane.

"There is a stone," Pliny says, "found in Thesprotia, known as anthracitis, resembling a burning coal in appearance, and which when drenched with water becomes doubly glowing. Some of these stones," he adds, "are said to be surrounded with a vein of white." These peculiarities would lead us to identify this stone with hydrophane, which acquires all the beautiful opalescent tints of the opal when immersed in water. The vein of white is evidently cacholong, which is frequently associated with hydrophane.

### Crystallus.—Crystal.

Rock crystal was supposed by the ancients to be a kind of ice, and that it was a substance which assumed a concrete form from excessive congelation. Hence its name from the Greek κρύος, cold. According to Pliny, the best crystal came from India, but that found on the Alpine heights was also highly valued.

It was never used for intagli by the Greeks or in the Roman period. It was exclusively employed for vases and cups. Nero is known to have possessed two very sumptuous vases of this material sculpture, with subjects from the Iliad, both of which we are told he dashed to pieces in a paroxysm of rage, when he received the tidings that all was lost. Pliny relates that there was such a mania for it, that a Roman lady, who was by no means rich, gave 150,000 sesterces for a single bowl, made of crystal. According to Pliny, Xenophanes speaks of having seen a vase of crystal, which held one amphora. Pliny also men-

tions, as the largest work of crystal that has ever been beheld, the one that was consecrated by Julia Augusta in the Capitol, and which weighed about 150 pounds.

Under the Lower Empire, crystal seems to have been much in use for making solid finger-rings, carved out of a single piece, the face engraved with some intaglio serving for a signet.

In Italy, during the Renaissance period, some important intagli in crystal have been executed. Valerio Vicentino was famous for this style of work. In the Cinque-cento Collection in the museum at Naples is a magnificent casket of silver, gilt, with engraved plaques of crystal, representing mythological subjects, and various events in the history of Alexander the Great, in complimentary allusion to the achievements of Alessandro Farnese, to whom it belonged. It bears the name of Joannes di Bernardi. A casket of rock crystal, on which are engraved the events of the Passion, by Valerio Vicentino, is in the cabinet of gems in the Florentine Gallery. It was a present from Pope Clement VII. to Francis I., on the marriage of his niece, Catherine di Medici.

Crystal has been often used, both in ancient and modern times, for the purpose of fraud. In Pliny's time the art was well known how to stain crystal, so as to pass for emerald or any other transparent precious stone.

### Amethystus.—Amethyst.

Among stones of a purple colour, Pliny gives the first rank to the amethyst of India, a stone which is also found, he says, in the part of Arabia that adjoins Syria, and is known in Petra, as also in Lesser Armenia, Egypt, and Galatia; the very worst of all and the least valued being those of Pharos and Cyprus. Another variety approaches more

nearly the hyacinthus (sapphire) in colour: the people of India call this tint *socon*, and the stone itself *socondion*. Another was in colour like that of wine, and a last variety but little valued, bordering very closely upon that of crystal, the purple gradually passing off into white. A fine amethyst should always have, when viewed sideways (*in suspectu*), and held up to the light, a certain purple effulgence, like that of carbunculus, slightly inclining to a tint of rose. To these stones the names of *pœderos* and 'Venus' eyelid' (*Veneris gena*, Ἀφροδίτης βλέφαρον) were given, being considered as particularly appropriate to the colour and general appearance of the gem.

The name which these stones bear, originates, it is said, in the peculiar tint of their brilliancy, which, after closely approaching the colour of wine, passes off into a violet, without being fully pronounced. "All these stones," Pliny adds, "are transparent, and of an agreeable violet colour, and are easy to engrave. Those of India have in perfection the very richest shades of purple."

At the present day the finest amethysts come from India, and lapidaries apply the term Oriental to the amethystine quartz when of a very brilliant violet tint, and of two shades of colour (qualities distinguishing the Indian from the German). This stone must be, however, carefully distinguished from the true Oriental amethyst, which is a sapphire of a violet colour.

"Intagli of all dates," Mr. King says, "and in every style, occur upon amethysts, but so much more generally on the pale sort that an engraving upon one of a rich dark colour, may, on that very ground, be suspected as modern. Although the amethyst came into use amongst the earliest materials used by the gem engraver, for we find in it an abundance of Egyptian charms (pendants for necklaces), in

the form of vases, shells, bands, &c., and sometimes Scarabæi, the last of Etruscan work also, and Roman intagli in it are sufficiently numerous, yet it is a singular fact that we rarely meet with works in the highest style executed in this material. Probably the superior kind was too precious to be so employed, whilst the paleness of the other and cheaper sorts was repugnant to the taste of first-rate artists." [6]

Some fine Greek intagli occur in this stone. Mr. King mentions, among others, the Marlborough Omphale, on an amethyst (of the Indian kind) of superior lustre and richness of colour, and the Berlin Atalanta engraved on a large circular convex stone. Among other celebrated engravings

Diana of Appollonius.

Pallas of Eutyches.

Medusa.

in amethyst are the Pallas of Eutyches, deeply engraved on a pale amethyst, the Achilles Citharœdus of Pamphilus (Paris). The Diana, of Appollonius (Naples), the Medusa (Blacas), the Mecænas of Dioscorides (Paris), a head of Pan, deeply sunk in a pale amethyst inscribed ΣΚΥΛΑΞ, in the Blacas Collection. In the Devonshire Collection is a magnificent amethyst intaglio, bearing the bust of Shappur I.

[6] "Natural History of Gems," p. 31.

of the race of the Sassanides.[7] This stone ($1\frac{1}{4} \times 1$ inch oval) forms the centre in the comb[8] belonging to the *parure* of antique gems, the property of the Duke of Devonshire. In the Florentine collection is a large amethyst with the portrait of Mithridates the Great. "Heads, and even busts," Mr. King writes, "both in full and in half relief, often occur of antique workmanship in this stone, as some perfectly-preserved remains show they served to complete statuettes in the precious metals. The grandest of Medusa heads, the Blacas, is carved out of an amethyst of the darkest violet, two inches in diameter."

According to some authorities, the name amethyst has been derived from *α* not, *μεθύω* to intoxicate, on account of its being a supposed preservative against inebriety. Von Hammer suggests the Persian *shemest* as the true origin of the word.

### Craterites.—Yellow Quartz.

Craterites, which Pliny describes as in colour a medium between chrysolithus and amber, and as remarkable for its hardness, may be a yellow quartz which is often met with of a rich orange yellow, partaking of the colour of amber. Pliny's Pontic Chrysolectri, and his Chrysolithus, twelve pounds in weight, may be also identified with yellow quartz.

Yellow crystal was seldom engraved upon by the ancients. Only a few examples are known. The best are a head of Julia Titi (Rhodes), a replica of the famous beryl of

[7] According to Mr. Thomas, the legend surrounding the central portrait proves that it constituted the royal signet of *Bahram* Kerman Shah, the son and second eventual successor of Sapor the Great, (Postumus, A.D. 310. 381), so celebrated in the wars of the Lower Empire as the too-successful opponent of the Byzantine Constantius.

[8] See frontispiece.

Evodus, and a large double uneven stone of great lustre, covered with a Gnostic formula on both sides (British Museum). An intaglio with the head of Horace, in the Blacas Collection, is also of yellow crystal.

Cinque-cento and recent engravers have largely turned to account this material.

Citrine or yellow-green quartz was sometimes used by the ancients for intagli. This stone and yellow quartz are the only yellow stones which have come down to us from antiquity. It would appear that yellow stones were not in favour with the Romans, with the exception of those partaking of an orange tint. Yellow was, however, a colour much affected by the Greeks in their choice of gems ; with the Romans, as children of Mars, *red* was the favourite.

### Iris.

Pliny mentions this stone as found in a certain island of the Red Sea, forty miles distant from the city of Berenice. It is partly composed of crystal, and is hexahedral in form, like crystal. It takes its name iris from the properties which it possesses ; for, when struck by the rays of the sun in a covered spot it projects upon the nearest walls the form and diversified colours of the rainbow. Opinion seems divided as to whether this is Hyaline quartz iridized internally (called at the present day iris) or the prismatic crystals of limpid quartz, which decompose the rays of the sun.

### Sandastros (female). Avanturine.

The female sandastros, which Pliny describes as possessing a flame of a more softened nature, and which may be pronounced to be lustrous rather than brilliant, is doubtless the stone termed avanturine. Pliny further writes that

"Ismenias asserts that sandastros, in consequence of its extreme softness, will not admit of being polished." This can alone be applied to the male sandastros (sunstone), which being a felspar is softer in its nature than the female sandastros (avanturine quartz). One point, Pliny adds, upon which all the authorities are agreed is, that the greater the number of stars upon this stone the more costly it is in price. The best specimens of sunstone and avanturine present a number of starlike specks in it, the first being scales of oxide of iron, and in the second minute spangles of mica.

Hammichrysos, which Pliny describes as resembling sand in appearance, but sand mixed with gold, was evidently another name for this stone.

### Sandaresos.—Green Avanturine.

Pliny tells us that a stone of the name of sandaresos is mentioned by Nicander as a native of India as well as sandastros. The colour of it is that of an apple, or of green oil, and no one sets any value on it. This is undoubtedly the green avanturine, which comes from India.

### Sardius.—Sard.

The sardius of the ancients is the rich and bright red, or yellowish red chalcedony, or Oriental carnelian. According to Pliny it derived its name from Sardis, where it was first found, but modern writers derive it from *zerd*, the Persian for yellow, the yellow sard being the stone most affected by the Greeks. The red was the favourite of the Romans.

"The most esteemed kind," Pliny says, "was from the vicinity of Babylon. In India there are three varieties of this stone; the red sarda, the one known as 'pionia,' from its thickness, and a third kind, beneath which they place a

ground of silver tinsel. The Indian stones are translucent, those of Arabia being more opaque. There are some found also in the vicinity of Leucas in Epirus, and in Egypt, which have a ground placed beneath them of leaf gold."

India (Cambay) still furnishes the finest kinds of sard or red cornelian. Pliny divides these stones into male and female, the male being more brilliant than the female, which is more opaque.

"The gradations of colour," Mr. King writes, "exhibited by the antique sard are almost innumerable. The bright cherry deepens into the fiery red of the carbuncle, and thence into a semi-opaque black, only red when viewed by transmitted light. The bright pale yellow increases in intensity to the richest orange, and thence to a reddish-brown scarcely to be distinguished from the jacinth" (hyacinthine garnet).

"In this stone," we further quote Mr. King, "nearly all the performances of the most celebrated antique artists are to be found, for as a general rule fine work was never thrown away upon an inferior or too obdurate a material; and there was good cause for this preference; such was its toughness, facility in working, beauty of colour, and the high polish of which it is susceptible, which last, Pliny remarks, it retains longer than any other gem." [9]

Greek artists usually adopted the pale sard for the finer and more delicate works, but we find the blood-red sard and the brown sard occasionally employed by the engraver.

The finest Roman intagli are for the most part found in the bright-red sard, being the variety held most in esteem by the Romans.

[9] "Natural History of Gems," "Sardius."

In the collection of the author is a beautiful specimen of an intaglio in the bright-red sard ($1\frac{1}{2}$ by 1 inch, oval). The subject is a Victory with trophies, inscribed ΣΟΛΩΝΟS. It was formerly in the Demidoff Collection.

"The light-yellow sort," Mr. King says, "was much employed at an earlier period. On *this* most frequently occur the finest works of the Greek artists, more especially those stiffly drawn but highly-finished figures of the most minute execution, surrounded with borders, which were formerly termed Etruscan, but now are with more reason ascribed to the Archaic Greek school. Some good Roman works occur in this variety, but they are few in number, and of an early date, thus scarcely confirming Pliny's statement as to the disrepute into which the yellow-coloured had fallen."

The pale rich yellow, or golden sard, was the favourite stone of the Greek artist.

In the yellow sard, which is less transparent and where lurks the brightness of the golden sard, several Archaic Greek and Roman engravings occur. The Archaic Greek intaglio of Hercules discharging his arrows at the Stymphalian birds is yellow sard.

The hyacinthine sard is the term applied to a rich and glorious variety of this stone which possesses the orange-red tint, with almost the transparency of the kind of garnet termed in France *hyacinthe la belle*. One beautiful example of this stone, bearing an intaglio of a Bacchante, is in the Blacas Collection.

Sardine, the sardoine of the French, is a dark-red translucent, but sometimes very transparent sard, the aspect of which is almost black, its fine colour being only seen when it is looked through. It often carries noble work of the late Greek, and early Imperial Roman periods, but still oftener the works of the Cinque-cento and modern artists.

When the sard-like layers of the onyx are of inferior or opaque quality, the stone passes into jasper-onyx.[1]

"Those stones," Pliny says, "which are like honey in colour, are generally disapproved, and still more so when they have the complexion of earthenware." In this dull red, earthy kind (the common carnelian) are the most ancient intagli usually cut, the Egyptian and Etruscan scarabæi, and the greater part of the other ring-stones engraved in Etruria.

### Sardonyx.

It has been defined by Pliny as originally signifying a white layer over sard (*candor in sarda*), like the human nail placed upon flesh, both parts of the stones being equally transparent. Such, according to Ismenias, Demostratus, Zenothemis, and Sotacus, was the sardonyx of India.

"At the present day," Pliny says, "the Arabian sardonyx presents no traces whatever of the Indian sard (i. e. of a transparent red layer), it being a stone that has been found to be characterized by several different colours of late; black or azure for the base, and vermilion, surrounded with a line of rich white, for the upper part, not without a certain glimpse of purple as the white passes into red.

"In the stones of India," he says, "the ground is like wax in colour, or else like cornel, with a circle also of white around it. In some of these stones, too, there is a play of colours like those of the rainbow, while the surface is redder than even the shell of the sea-locust."

Pliny relates that in the time of Zenothemis "these stones were not held by the people of India in any high esteem, although they were found there of so large a size as to admit of the hilts of swords being made of them. It is well

[1] Maskelyne. Introduction to Catalogue of Marlborough Gems.

known, too, that in that country they are exposed to view by the mountain streams, and that in our part of the world they were formerly valued from the fact that they are nearly the only ones among engraved precious stones that do not bring away the wax when an impression is made. The consequence is, that our example thus at last taught the people of India to set a value upon them, and the lower classes there now prize them even to wear as ornaments for the neck; the great proof, in fact, at the present day, of a sardonyx being of Indian origin." Pliny also mentions that the first Roman who wore a sardonyx, according to Demostratus, was the elder Africanus, since whose time this stone has been held in very high esteem in Rome.

With most ancient writers three colours were considered essential to the idea of a sardonyx; hence termed by Lucian ψῆφος τῶν τριχώμων ἐρυθρὰ ἐπιπολῆς, as appears also from what Pliny says as to the manner of forging it (xxxvii. 75). "Sardonyx gems are made up out of three stones cemented together so neatly that the fraud cannot be discovered, by selecting one a black, another a white, the third a red, each one the best in its respective kind." In the same sense Martial makes his lady-killer boast of a real sardonyx thrice girt with zones.

"Sardonycha verum lineisque ter cinctum."

Though *three* layers at least were required to constitute a true sardonyx (with only *two* it remained an onyx), yet these might be repeated indefinitely without altering its designation. Köhler lays down "that it was a sardonyx as long as the different colours lay in regular layers one over the other. It was sardonyx, whether the white stratum united with a male or female (dark or light) sard; whether the stone possessed three, four, five, or nine strata. For the

name sardonyx implied the regular union of the sard with a white layer; now the sard exhibited innumerable gradations into red, yellow, brown, and black."

In the opinion of Mr. King, a perfect Oriental sardonyx is still required to exhibit the same characters as when Pliny defined them. The base must be black (in reality a translucent chocolate colour when held against the sun), the middle zone opaque fatty white, the surface a light brown or red.[2]

The Romans rarely engraved intagli on sardonyx. They employed it in their jewellery and rings, cut either *en cabochon*, or in a truncated cone of an oval section, more or less high, so proportioned as to display the three zones to the greatest perfection. When intagli are found in a sardonyx they are always sunk but slightly into, or rather sketched upon, the surface, so as to be invisible at a trifling distance.

It was for camei that this material was specially reserved; the various shades, taken advantage of with singular dexterity by the artist, enabled him to add the charm of colour to the relief. He has frequently availed himself with wonderful skill of the different colours of the alternating zones to express the different parts of the figure, such as the hair,

[2] "Dealers and others," Dr. Billing writes ("The Science of Gems," p. 66) "make an interminable confusion of nomenclature with respect to onyx and sardonyx, but the solution is very simple; it has been erroneously asserted that onyx means a stone of two strata, sardonyx of three or more. The terms have not the slightest reference to the number of strata. Onyx means merely the superposition of at least one stratum over another, one being white, and the other pale, translucent or red, or black, or brown, or any other colour; but if that other colour be sard, it constitutes a *sard*-onyx (sardonyx: *candor* in *sarda*; Pliny, lib. xxxvii.); and there may be three or more layers of either onyx or sardonyx."

the garments. These polychrome works belong to Roman and imperial times, more especially to the reign of Hadrian, to whose age may be referred the greater number of the fine Roman camei, representing in apotheosis the members of the Julian and Claudian families often upon sardonyxes of vast dimensions, and exhibiting from two to four or five

Cameo of the Sainte Chapelle.

differently-coloured layers of the stone, each of which has been taken advantage of by the engraver for the rendering of some particular portion of his design.

Some of the most celebrated productions of the glyptic art among the ancients have been executed in sardonyx.

The largest slab of this material known is that forming the Carpegna cameo (in the Vatican), 16 inches long by 12 deep, the subject the Triumph of Bacchus and Ceres, executed in a stone of five layers.

Next in size, 13 × 11 inches, is "le Grand Camée de France," known as the Agate of the Sainte Chapelle, representing the Triumph of Germanicus, and the Apotheosis of Augustus. This stone has also five strata.

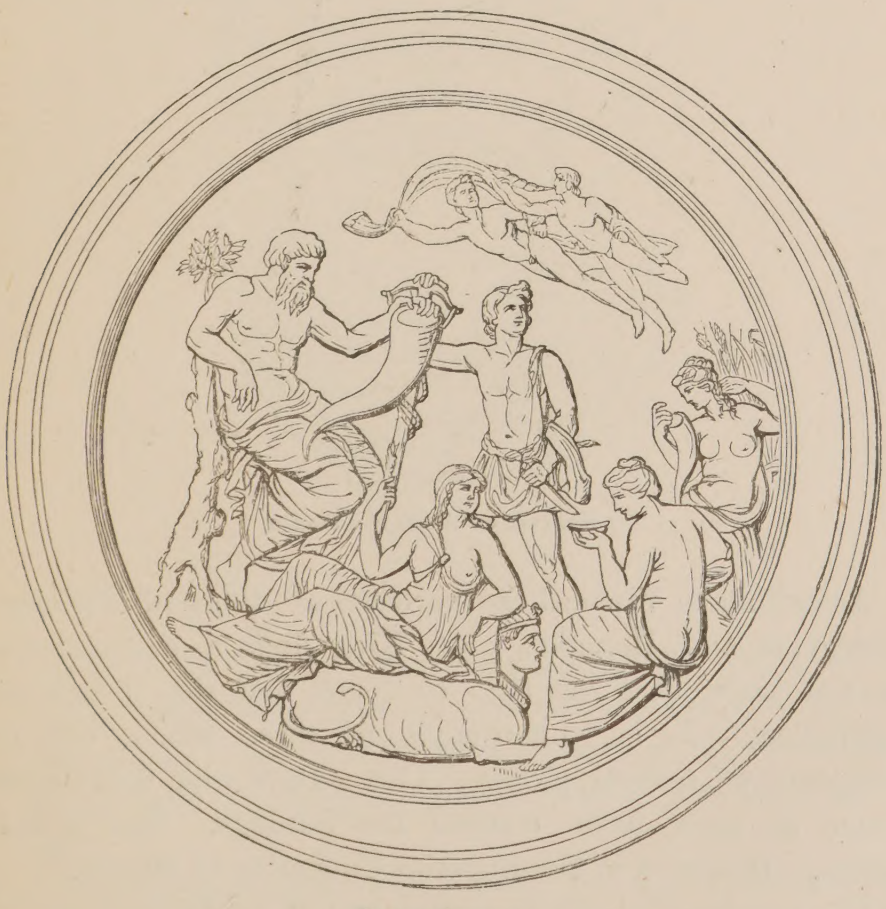
Gemma Augustea.

Third in point of magnitude, but superior as a work of art, is the "Gemma Augustea" of Vienna, the subject of which is the reception of Drusus (father of Germanicus) by Augustus as Jupiter, and Livia as Roma after his victory

over the Rhæti and Vendelici, B.C. 17. Its shape is elliptical, 9 × 8 inches. It has only two layers.

In the Marlborough Collection is, perhaps, the most extraordinary sardonyx in the world, for it presents strata of transparent sard, purple, or rather lilac, opaque white, and a ground of opaque black—colours not united in any other example known to the world. It bears in flat relief two imperial busts, attributed without much reason to Didius Julianus and Manlia Scantilla.

It is a very late and tame work, and may have belonged to some series of imperial portraits wrought at a late period,



Tazza Farnese.

so late a period, perhaps, as the age of Constantine, but it presents no marked likeness to any imperial pair of heads. It is 8 inches wide by 6 deep.

The Tazza Farnese in the museum at Naples is a beautiful specimen of sardonyx, 8 inches in diameter. In the inner portion of the tazza is a cameo, the subject of which is supposed to be The Prosperity of Egypt. The outer portion is ornamented with the head of Medusa in relief.

The Gonzaga or Odescalchi Cameo.

According to Visconti the portraits are those of Ptolemy Euergetes and Berenice. Mr. King finds a resemblance in the male head to that of Nero, and the female to Agrippina. It is a sardonyx of three strata, but is composed of several pieces. The collars and ornaments given to each head conceal the joinings. Size $6 \times 5$ inches. It is now in the Imperial Collection of Russia.

The two-handled cup or carchesium of St. Denis, usually

styled the cup of the Ptolemies, is made of a splendid sardonyx, 5 inches high. Its sculptures represent masks, vases, and other Bacchic emblems. It was supposed to have been executed for Ptolemy Dionysus, but, as Mr. King says, it may be assigned to Nero, a great amateur in vases of this material.

Another celebrated vase of sardonyx is the Brunswick vase, which represents the myth of Ceres in search of Proserpine, and that of Triptolemus. It is an alabastron, or tall perfume jar, with narrow neck; 5 inches high by 2 in the greatest diameter. Its style is supposed to indicate the age of the Antonines.

Augustus.

The noble bust of Augustus, with the ægis on the breast, in the Blacas Collection, is a cameo of sardonyx of three layers. It is of an oval form, measuring $5\frac{1}{4}$ inches by $3\frac{5}{8}$. It has been generally considered to belong to the Augustan age.

The variety termed chalcedonyx, in which antique camei sometimes occur, is not mentioned by any ancient writer.

A cameo of this stone of two layers, white and grey, representing Neptune and Amymone, is in the possession of the author.

### Onyx.

Numerous and conflicting are the definitions of onyx given by ancient writers. Theophrastus defines onyx as a mixture of white and dark brown placed alternately. Pliny gives different descriptions of the Indian and Arabian varieties of onyx according to Zenothemis and Sotacus, and tells us that Sudines says that in this stone there is a white portion which resembles the white of the human finger-nail, in addition to the colours of chrysolithus, sarda, and iaspis, and lastly says that the real onyx, according to Satyrus, has numerous veins of variegated colours, interspersed with others of a milk-white hue.

Köhler makes the following distinctions between onyx and sardonyx, basing his view on the definitions of onyx given by ancient writers. "The question, how is the onyx to be distinguished from the sardonyx, is now easily to be answered out of Pliny. As far as regards the substance and the colours, both are one and the same stone. It is called onyx when the red, brown, or yellow ground is covered with white veins irregularly and capriciously disposed. If therefore these veins formed sometimes stripes, sometimes spots, sometimes eyes, then was the stone the onyx. But if the various colours of this stone lay in regular strata, one over the other, then it became the sardonyx." The onyx of the ancients would thus appear to be our agate, an irregularly-stratified stone, the layers of which are wavy and often concentric, and the sardonyx the regularly stratified stone.

The description, however, of Theophrastus and of the Arabian onyx would seem to point to the onyx as consisting

of parallel horizontal white and black layers, like the onyx of our day.

In the modern acceptation of the word, onyx is defined as consisting of *only two layers*, a white over a black.

The onyx or agate seems to have been in much use among the ancients for vases. The earliest notice extant of onyx vases occurs in Appian (Bell. Mith., 115), where he enumerates amongst the treasures of Mithridates, captured at Talaura, 2000 vessels of onyx (λίθου ὀνυχιτίδος). Posidonius describes a collection of onyx bowls, found in *nests*, and Epiphanius speaks of the Oriental princesses as delighting in drinking-vessels cut out of the onyx.

Fragments of cups of onyx (agate) are frequently found among Roman ruins. In the possession of the author are some fragments of these cups, which present all the irregularly-stratified features of the onyx as defined by Köhler, and as described by Satyrus.

The banded, or so-called tri-coloured agate, so cut that the strata are seen crossing the stone, was much affected in the earlier, and also common in the late phase of ripened Greek taste, especially in Magna Grecia.

The finest onyxes or agates came from India in ancient times. They are mentioned by the author of the "Periplus of the Red Sea," as being brought from Ozene (Ougein) down to Baryguza (Broach, in the Gulf of Cambay) for exportation.

At the present day a great abundance of the finest varieties of agates or onyx-stones come from the Nerbudda, and from Malwa, above the Vindhyas.

### Jasp-onyx.

Pliny's "onychi juncta quæ jasp-onyx vocatur," Mr. King writes, is indicated by the very composition of the name, as

that extremely rare onyx, in which a true opaque red jasper is superimposed upon a plasma, to use modern terms. In such material was engraved the wonderful Corinthian helmet, the glory of the (old) Poniatowsky cabinet.

### Beli Oculus.—Eye Onyx.

Beli oculus, which Pliny describes as a stone of a whitish hue, surrounding a black pupil in the middle, which shines amid a lustre like that of gold, was only some highly-shaded variety of the eye onyx. Pliny adds, "This stone, in consequence of its singular beauty, has been consecrated to the Deity (Bel), and held in the highest veneration by the people of Assyria." It is much prized at the present day in India.

Another variety of the eye onyx is Leucopthalmos, which he describes as of a reddish-hue, and presenting all the appearance of an eye, in white and black.

### Ægyptilla.—Nicolo.

"The stone commonly known by that name," Pliny writes, "is black at the lower part, and blue on the surface." This is an exact description of the variety of onyx known as nicolo, consisting of a layer of a bluish tint over black. When used for an intaglio, the design was cut down through the blue layer into the black.

Intagli in this stone are invariably in the Roman manner, and in style all posterior to the reign of Nero. They usually have bevil edges.

The nicolo continued to be a rather favourite stone so long as gem-engraving existed as an art, and among the gems of the Sassanian empire we find mingled with many luminous and lovely sards, and with transcendent garnets,

nicolos presenting the finest contrasts in their colours, all these stones carrying the singular and rudely-worked subjects which seem to have represented an art inherited from the days of Mesopotamian cylinders, and Persian conical stamps, but modified in its *technique* by the introduction of methods, especially the use of a coarse wheel from the West.

Mr. King mentions a splendid specimen of an intaglio in this stone formerly in the Hertz collection. It is an oval nearly 2 inches high, of the richest blue and black, engraved in a very bold manner, with Apollo resting his lyre on a column, and standing before a tall smoking tripod. A nicolo with the head of Caracalla is in the Blacas Collection.

### Prasius.—Plasma.

The prasius of Pliny is a plasma, a chalcedony of leek-green colour, with a waxy lustre. By Pliny it is considered the commonest among the numerous kinds of green stones. It was extensively used for intagli among the Romans at a later period, the subjects engraved being mythological figures, such as Victories, Venus and the Graces, Eagles, &c., of a late epoch of Rome.

Mr. King mentions only one intaglio in plasma possessing great artistic merit—a bust of Severus, in a large gem of remarkable beauty, in the British Museum.

Camei in this stone are abundant, but seem, with few exceptions, to belong to the times of the Renaissance or later.

Plasma di smeraldo and prasina, terms by which this stone is known in Italy, are corruptions of prasius.

According to an authority, the ὄμφαξ of Theophrastus was a plasma, a pale green chalcedony, but of the greatest rarity when carrying true Greek work.

Some modern writers frequently confound this stone (plasma) with prase, a stone of a different nature. It is a dull green, impure, translucent vitreous quartz. No antique intagli occur in this stone; it was evidently unknown to the ancients.

### Prasius Sanguineis Punctis.—Heliotrope.

This variety of prasius, mentioned by Pliny as disfigured with spots like blood (*sanguineis punctis*), is our heliotrope, a plasma, or green chalcedony, interspersed with small patches of opaque bright red jasper.

### Jaspis.—Chalcedony.

The following is Pliny's description of this stone:—"Jaspis is green, and often transparent. Many countries produce this stone. That of India is like smaragdus in colour; that of Cyprus is hard, and of a pale sea-green; and that of Persia is sky-blue, whence its name, *aërizusa*. There is also the 'terebinthyusa iaspis.'"

From greenness and, more or less, translucency being the essential characteristics of the ancient jaspis, it cannot be identified with the jasper of modern times, as it is an opaque stone. The jaspis of Pliny would appear to include the several varieties of chalcedony—the green, the blue, the yellow; in a word, as Mr. King says, every colour except the blood-red, which gave its name to the sard.

The green jaspis of India and that of Cyprus, mentioned by Pliny, appear to be plasmas, while that of Persia (the *aërizusa*) is the sapphirine, or blue chalcedony, of modern times, and the jaspis terebinthyusa, the yellow chalcedony.

The leuchachates of Pliny is according to some writers white chalcedony, or our modern white carnelian.

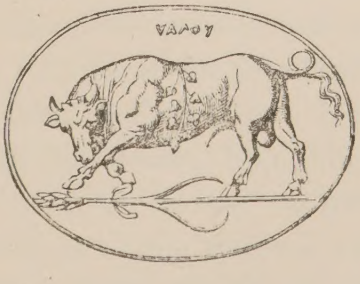
The Indian green jaspis of Pliny appears to be a plasma of a rarer kind, and almost approaching in colour to the emerald, while the prasius was a plasma of a commoner sort, in which the greater number of Roman intagli were engraved. At the present day a fine green Indian plasma comes from the Vendhya hills.

Some intagli of a Roman period occur in this jaspis, or plasma, of a beautiful emerald colour.

Pliny mentions a variety of this stone, "like emerald in colour, but traversed by an opaque white band through the middle," called jaspis monogrammos. An example of this stone occurs in a gem in the Blacas Collection. It represents a young Faun standing and lifting his cup on high.

Cylinders of the Assyro-Babylonian or later Babylonian period often occur in sapphirine. It was also a favourite stone for Assyrian conical stamps. The most beautiful Persian cylinder known is in sapphirine. Some fine examples of Greek workmanship appear in this stone. A beautiful Greek intaglio on a large stone of this sort is in the British Museum; the subject is a Victory crowning a trophy. Roman intagli in sapphirine are also frequently met with.

Medusa of Solon.



Dionysiac Bull of Hyllus.

Babylonian cylinders are frequently made of grey chalcedony, and it is the material almost exclusively used for

the large conical seals of the Sassanians. Scarabæi of Etruscan work, as well as Greek and Roman intagli, frequently occur in this material. The Dionysiac Bull of Hyllus (Paris) and the Medusa of Solon (Blacas) are in grey chalcedony.

Busts and heads in full and in bas-relief, and of considerable size, were executed by the Romans in chalcedony. Under the Empire these carvings constituted the phaleræ so often mentioned as military distinctions on armour.

Many modern intagli occur in white chalcedony or carnelian, but it was a stone never employed in ancient times.

### Achates.—Sicilian Agate.

Theophrastus, in his work on stones, says, "Achates is a beautiful stone; it has its name from the river Achates (the Drillo), in Sicily, and is sold at a great price." Pliny writes, "Achates was a stone formerly held in high esteem, but now held in none. It was first found in Sicily, near a river of that name, but has since been discovered in numerous other localities. In size it exceeds any other stones of this class, and the varieties of it are numerous, the name varying accordingly. Thus, for example, we have iaspachates, cerachates, smaragdachates, hæmachates, leuchachates, dendracates (marked with small shrubs), autachates, and corralloachates, spotted all over with drops of gold, and commonly found in Crete, where it is also known as 'sacred' achates." He mentions also a property of the Sicilian stones as being good for wounds inflicted by spiders and scorpions. "The stones that are found in India," he continues, "are possessed of similar properties, and of other great and marvellous properties as well; for they present the appearance in them of rivers, woods,

beasts of burden, and forms even like ivy and the trappings of horses."

Theophrastus and Pliny in their description of achates seem to speak only of that kind of agate which resembles the Sicilian, which never exhibits stratification or zones. It always occurs in patches of yellow and white, brown and white, red and white, &c., intermingled. Sicily at the present day continues to supply an abundance of agates and jaspers of beautiful varieties, with which some of the churches in Sicily are profusely ornamented.

The stratified stones with zones of colour, which come from India and Brazil, and to which at the present day the term of agate is applied, were evidently the onyx of the ancients.

This distinction is confirmed by De Boot (1195), who says, "Next in appearance and in colour to the onyx is the agate. The onyx is adorned with *zones* of colour, the agate is not. For, instead of *zones*, it is ornamented by nature in a wonderful manner, with lines or spots of various colours, which exhibit images of different objects; some, for instance, represent, far from obscurely, trees, animals, fruits, flowers, clouds," &c.

Pliny's cerachates, sardachates, hæmachates, smaragdachates, are thus evidently only the different varieties of the Sicilian agate, and those from India and other countries resembling them, in patches or spots of yellow and white, brown and white, red and white, green and white, &c.

The smaragdachates may be identified with the beautiful green agate from India (Cambay).

The dendrachates, marked with small shrubs, of which Pliny mentions such numerous varieties in India, were doubtless the moss agate, or that generally termed mocha stone. It is chiefly brought from Arabia. "Variegated

stones with landscapes, trees and water, beautifully delineated, are still found in India at Cubberpunj (the five tombs) a place sixty miles distant from Rajpipla in Guzerat.[3]

The coralloachates appears to have been a variety peculiar to Crete, but is now unknown to us.

### Astrobolos.—Cat's Eye.

"Sudines says," Pliny writes, "that astrobolos resembles the eye of a fish in appearance, and that it has a radiant white refulgence when viewed in the sun." This is not improbably the cat's eye, a translucent variety of Chalcedonic quartz, which displays a peculiar floating white streak of light when cut *en cabochon.*

Amongst the Marlborough gems is a monster cat's eye, $1\frac{1}{2}$ inch high, carved into a lion's head. It belongs to the Cinque-cento period.

### Jasper.

Red and yellow jasper, in which Roman intagli abound, appears to have come into use after Pliny's date, as he nowhere mentions any stones which can be identified with

Pallas of Aspasius.

them. Engravings on these stones belong to the times of the Middle Empire and the decline.

[3] Forbes's "Oriental Memoirs," vol. ii. p. 20.

A fine homogeneous red jasper, Mr. Maskelyne tells us, of a vermilion colour, that is found in a breccia in India, and also in Egypt, was often used for Roman gems in the later times of the Empire. The most celebrated work in red jasper is the elaborately helmeted, but noble head of Minerva, at Vienna, signed ΑCΠΑCIOΥ.

In the Marlborough collection is a head of Vespasian, in red jasper, probably a contemporary work, and a very early example of this material. Red jasper often carries imperial portraits of the time of Hadrian, and more particularly of his Antonine successors, with the characteristics of the work of those times.

Red jasper is still found in Sicily, but it does not take a good polish, and is spotty in colour, and full of veins.

The bright vermilion jasper, in which many Roman intagli frequently occur, was perhaps the corallis of Pliny, which he describes as a native of India and Syene, and resembling minium in appearance.

Some writers connect the hæmatites of Pliny's alphabetical list, which he describes as a stone of a blood-red colour, and which comes of the very finest quality from Æthiopia and also from Arabia and Africa, with red jasper.

Roman and Gnostic engravings of a late date, and of inferior work, frequently occur in yellow jasper. It appears, however, that this stone was used at an early period in Egypt. In the British Museum is a small seal tablet, of beautiful yellow jasper, carrying on one side a hollow backed horse ; on the obverse is a bull standing at rest, with the cartouche of Amenophis II. (1450 B.C.).

Black jasper, an extremely fine, close-grained substance, and perfectly opaque, Mr. King tells us, has been employed by the Greeks, as the material for some of their finest intagli ; for example, the fragment of the head of the dying

Medusa (Praun collection). A seated sphinx, a Greek work, in this stone is also noticed.

No description of a gem answering to this stone is to be seen in Pliny's list.

Inferior, or Lower Empire, work never occurs in this material.

### Molochites.—Green Jasper.

"Molochites," Pliny says, "is not transparent, being of a deeper green and more opaque than smaragdus; its name is derived from the mallow (μολόχη), which it resembles in colour. It is highly esteemed for making seals. This stone is a native of Arabia." This is undoubtedly our green jasper. The stone which Pliny terms *sphragis*, from the circumstance of its being the best of all for making signets, is evidently the same stone.

The green jasper, which was much used in antiquity for the earliest Assyrian cylinders and for the latest Gnostic amulets, is a mixture of the green mineral chlorite with chalcedony.

Phœnician scarabæi are usually made of a dark green chlorite jasper. The scarabs found in the cemeteries of Tharros, in the island of Sardinia, are also of a dark green jasper, and are undoubtedly Phœnician.

No gem of Greek type is known in green jasper. Some Roman intagli are, however, met with in this stone. Mr. King notices two, one of a racer bearing off the palm of victory, his name "Tiberis" inscribed over him, in his own collection; and another with the conjoined heads of Diocletian and Maximian in the character of Janus, in the late Praun collection.

Sassanian seals frequently occur of the same material.

A dark green, opaque, close-grained jasper, occasionally

clouded with red, was in great request with Egyptian engravers for religious intagli, from the epoch of the Pharaohs down to the Arabian conquest. The Basilidan talismans affect this material above all others.

In the Marlborough collection is an opaque, pale green jasper (only found in India now), bearing in intaglio the profile portrait of Cleopatra with the head attire, the sacred Vulture, and other ornaments of an Egyptian queen.

A dull, pale green variety of jasper is used at the present in Persia for seals.

The Prasius, described by Pliny, with three streaks of white, is, according to Mr. Maskelyne, a white-veined green jasper, found in India.

### Heliotropium.—Bloodstone.

"Heliotropium," Pliny writes, "is found in Æthiopia, Africa, and Cyprus. It is of a leek-green colour, streaked with blood-red veins. It has been thus named (from ἥλιος, the sun, and τρέπω, to turn) from the circumstance that, if placed in a vessel of water, and exposed to the full light of the sun, it changes to a reflected colour like that of blood." This stone is undoubtedly the modern bloodstone, an opaque green jasper, with red streaks. Antique intagli, in this stone, are rarely to be met with. It occurs, however, not unfrequently amongst the talismans of the later Egyptian and Gnostic times.

It was held in great favour in the Byzantine period, and by the artists of the Revival, from an old tradition that it owed its origin to the stones lying under the Cross, on Calvary, stained by the droppings of the Saviour's blood.

Vasari mentions a work by Matteo del Nassaro, in this stone, representing the Descent from the Cross, in which

the sanguine spots exactly depicted the blood trickling from the wounds of the Saviour.

Bloodstone is at the present day much used for seals. In Italian catalogues of gems it is styled *jaspro sanguineo*.

### Smaragdus Medicus.—Malachite.

The smaragdus medicus, which Pliny describes, as found of greater dimensions than any other sort of smaragdus, of a wavy pattern, and sometimes resembling sapphirus (lapis lazuli), is, in the opinion of most writers, our malachite, a green carbonate of copper, and the substance resembling sapphirus, azurite, a blue carbonate of copper frequently associated with it.

It was sometimes, but very rarely, used by the ancients for camei. The Pulsky Collection affords an example of a cameo in malachite, representing the bust of a Bacchante. It belongs to the best period of Roman art.

### Hæmatites.—Hematite.

"Hæmatites," according to Pliny, "of the very finest quality, comes from Æthiopia, but it is found in Arabia and Africa as well. It is a stone of a blood-red colour." Theophrastus also describes it as "of a dense, solid texture, dry, or, according to its name, seeming as if formed of concrete blood." The name hæmatites is derived from αἷμα, blood. This stone is identified with hematite, or red iron-stone. It has been often used for scarabæi and intagli by the Egyptians, and for cylinders by the Assyrians.

### Magnes.—Magnetite.

Sotacus, according to Pliny, describes five different kinds of magnes, all, no doubt, varieties of oxide of iron. The Ethiopian, the best, and sold for its weight in silver;

that of Magnesia, bordering on Macedonia; a third from Hyettus in Bœotia; a fourth from Alexandria in Troas; and a fifth, from Magnesia in Asia. Those of Magnesia, bordering on Macedonia, are of a reddish black; those of Bœotia are more red than black. The kind found in Troas is black. Pliny, on the authority of Nicander, states that the magnet took its name from the herdsman who first discovered it in Mount Ida, by its attracting the nails in his soles, and the ferule of his staff as he walked over the bed. The magnetite used by the ancients for engraving on is generally of a metallic, steely lustre. Its Greek name was Ἡρακλεία λίθος, the Heraclean stone. It is the favourite material for Babylonian cylinders of the Archaic and later periods. It was also much in use in Egypt, and in Persia, for Cuphic signets. It was rarely used by the Romans, and that at a very late period: a tolerable intaglio in hematite, with a bust of Abundantia, is noticed in the Marlborough Collection. Rude intagli, with Gnostic subjects, used as amulets, have been largely manufactured in this stone. There is said to be a curious specimen of a small magnetite in the Collegio Romano, Rome, encircled with hieroglyphics, and which is said to present an unexhausted and still energetic action at its opposite poles.

### Obsidianum.—Obsidian.

"Among the various kinds of glass," Pliny writes, "we may also reckon Obsian glass, a substance very similar to the stone which Obsias discovered in Ethiopia. This stone is of a very dark colour, and sometimes transparent, but it is dull to the sight, and reflects, when attached as a mirror to walls, the shadow of the object rather than the image. Many persons make signet stones out of it." Pliny mentions further on that "gems were tested with the dust of

Obsian stone (Obsidian), as it will not leave a mark upon the surface of a genuine stone."

This Obsian stone, which Pliny says, resembles glass, is obsidian, a volcanic glass, produced by the fusion of felspathic rocks, or those containing or composed of alkaline silicates. In consequence of its reflecting properties, the ancient Romans and the Corinthians frequently made it into mirrors, and sometimes the walls of their apartments were ornamented with sheets of it for looking-glasses. The Mexicans also used it for mirrors, knife-blades, and points of arrows and lances. In Pliny's time it was largely imitated in glass, and employed as a material for plates and dishes.

Antique intagli, in obsidian, are extremely rare. Mr. King mentions one in the Praun Collection, a cock chimæra on a large obsidian, with a Gnostic design on the reverse.

Herodotus describes the Ethiopian contingent in the host of Xerxes, as equipped with reed arrows tipped with a stone, sharpened to a point, with which they engrave seals. This stone was evidently obsidian, with the sharp splinters of which the Egyptians doubtless carved their scarabæi of limestone, steaschist, and other soft materials. At the present day, flakes of obsidian are frequently found in several parts of Greece, evidently used in primitive times for arrow-heads.[4]

### Gagates.—Jet.

"Gagates," Pliny writes, "is a stone, so called from Gages, the name of a town and river in Lycia. It is

[4] In the possession of the author are several of these flakes of obsidian, from Marathon, Tanagra, and Aphidua, and some cores of the same stone, from Salagora, near Arta, kindly presented by Mr. Finlay. Obsidian is found in the island of Melos.

asserted, too, that at Leucolla the sea throws it up, and that it is found over a space twelve stadia in extent. It is black, smooth, light, and porous, differs but little from wood in appearance, is of a brittle texture, and emits a disagreeable smell when rubbed." This is an exact description of the well-known substance jet, which is a variety of lignite of a velvet black and emits when burnt a very strong bituminous smell. At the present day, it is found in the amber mines on the coast of the Baltic, where it is known by the name of black amber, and in alum shale, in the neighbourhood of Whitby, Yorkshire.

"Jet was," Mr. King says, "turned by the lathe into ornaments by the Britons, perhaps even before the Romans subjugated this island, since large rings worked out of solid pieces, for bracelets and anklets, are often discovered amongst other British remains. The round disks, cut out from the centre of these rings, the refuse of the turner, often found in heaps together in Dorsetshire, long puzzled antiquaries, who agreed to call them 'Kimmeridge Coal Money,' and to regard them as a primitive currency. Their true origin has been but lately ascertained."

Intagli in jet, sold as antique or mediæval, are said to be all recent forgeries, as the ancients never used that material for engraving on.

### Succinum.—Amber.

"Next in rank after *murrhina* and crystal," Pliny writes, "among the objects of luxury, we have amber (succinum), an article which, for the present, however, is in request among women only.

"There can be no doubt," he continues, "that amber is a product of the islands of the Northern Ocean, and that it is the substance by the Germans called *glæsum*. Amber

is produced from a marrow discharged by trees belonging to the pine genus, like a gum from the cherry, and resin from the ordinary pine. It is a liquid at first, which issues forth in considerable quantities, and is gradually hardened by heat or cold, or else by the action of the sea, when the rise of the tide carries off the fragments from the shores of these islands. At all events, it is thrown up upon the coasts in so light a form that in the shallows it has all the appearance of hanging suspended in the water. Our forefathers, too, were of opinion that it is the juice of a tree, and for this reason gave it the name of succinum, and one great proof that it is the produce of a tree of the pine genus is the fact that it emits a pine-like smell when rubbed, and that it burns, when ignited, with the odour and appearance of torch-pine wood."

"Amber is imported by the Germans into Pannonia, more particularly, from whence the Veneti, by the Greeks called Eneti, first brought it into general notice, a people in the vicinity of Pannonia, and dwelling on the shores of the Adriatic Sea. From this it is evident how the story which connects it with the Padus first originated, that after Phaeton had been struck by lightning, his sisters became changed into poplars, which every year shed their tears upon the banks of the Eridanus, a river known to us as the 'Padus.' To these tears was given the name of 'electrum.'

"One great proof that amber must have been originally in a liquid state, is the fact that, owing to its transparency, certain objects are be seen within—ants, for example, gnats and lizards. These, no doubt, must have adhered to it when liquid, and then, upon its hardening, have remained enclosed within."

"There are several kinds of amber," Pliny writes further.

"The white is the one that has the finest odour; but neither this nor the wax-coloured amber is held in very high esteem. The red amber is more highly valued; and still more so, when it is transparent, without presenting too brilliant and igneous an appearance. For amber, to be of high quality, should present a brightness like that of fire, but not flakes resembling those of flame. The most highly-esteemed amber is that known as the Falernian, from its resemblance to the colour of Falernian wine; it is perfectly transparent, and has a softened, transparent brightness. Other kinds, again, are valued for the mellowed tints, like the colour of boiled honey in appearance. When a vivifying heat has been imparted to it by rubbing it between the fingers, amber will attract chaff, dried leaves, and thin bark, just in the same way that the magnet attracts iron."

Amber even at the present day is still found on the coasts of the Northern Sea, the Baltic; and Pliny is evidently right in his conjecture that amber is produced from trees belonging to the pine genus, as, according to Professor Göppert, it is the viscous resin of a fir named by him *pinitis succinifer*.

Amber claims the highest antiquity in the list of substances used for personal ornament. It was much prized by the ancient Etruscans,[5] and was frequently introduced into their jewellery. In the possession of the author is an Etruscan ring with a piece of amber set in it. Scarabæi also frequently occur in this substance.

It was known to the early Greeks. A gold necklace

[5] There is supposed to have been a very active commerce of the Etruscans with northern Europe. The object of their quest was amber, as is established by the much more frequent occurrence of objects of Etruscan manufacture in the extreme north of Prussia than in any intermediate district.

hung with bits of amber (μετὰ δ' ἠλέκτροισιν ἔερτο, Odyss. xv. 460) is mentioned in Homer. Its Greek name was ἤλεκτρον, but Pliny tells us that Demostratus called amber 'lyncurion,' who attributed its origin to the urine of the wild beast known as the lynx.

It maintained a high value among the Romans, particularly at the time of Nero, and was largely used for ornamental and decorative purposes. Pliny tells us that the nets which were used for protecting the podium of the amphitheatre against wild beasts were studded with amber by Julianus, the manager of the gladiatorial exhibitions, for the Emperor Nero."[6] All the weapons and articles used during the games of the amphitheatre were also made of amber. The largest piece of amber that Julianus brought to Rome was thirteen pounds in weight.

Mr. King mentions as the most precious example extant of Roman carving in this substance, a ring in the Waterton Collection, formed into an elegant design with Cupids in full relief upon the shoulders, cut out of a single piece.

A most interesting specimen of carved amber is in the British Museum; it was formerly in the Pourtales Collection. The subject represents a bearded figure, whose legs appear to terminate in a serpent, embracing a draped female figure. This group measures $6\frac{5}{8}$ in. by $3\frac{1}{2}$ in., and is, probably, the largest extant specimen of amber sculptured by the ancients. Small figures carved in this material in a very Archaic style have been found in Etruria.

Amber has been occasionally found in tumuli in England. Perhaps the finest example of amber discovered in this country is the cup which some years ago was found at Hove, near Brighton, and is now exhibited with associated stone

[6] In the possession of the author is one of these amber studs.

and bronze implements in the Brighton Museum. Amber has been found in some of the tumuli explored by Mr. C. Spence Bates, in Dartmoor.

### Corallium.—Coral.

According to Theophrastus, "Κουράλλιον (coral) is a stone red in colour, and its shape cylindrical, in some sort resembling a root. It grows in the sea." Pliny writes: "In the same degree that people in our part of the world set a value upon the pearls of India, do the people of India prize coral. Coral is produced in the Red Sea also, but of a darker hue than ours. It is to be found also in the Persian Gulf, where it is known by the name of 'iace.' But the most highly esteemed of all is that produced in the vicinity of the islands called Stæchades (the Hyeres), in the Gallic Gulf, and near the Æolian Islands and the town of Drepana (Trapani), in the Sea of Sicily. Coral is to be found growing, too, at Graviscæ, and off the coast of Neapolis, in Campania, as also at Erythræ, where it is intensely red, but soft, and consequently little valued."

"Its form is that of a shrub, and its colour green, its berries are white and soft while under water, but the moment they are removed from it they become hard and red, resembling the berries of cultivated cornel in size and appearance. They say that, while alive, if it is only touched by a person, it will immediately become as hard as stone, and hence it is that the greatest pains are taken to prevent this by tearing it up from the bottom with nets, or else cutting it short with a sharp-edged instrument of iron, from which last circumstance it is generally supposed to have received its name of 'curalium,' (from κουρὰ, shearing). The reddest coral and the most branchy is held in the highest esteem, but, at the same time, it must not be rough or

hard like stone, nor yet, on the other hand, should it be full of holes or hollow."

The Romans seem to have employed coral merely as an amulet and in medicine, for Pliny tells us, bunches of corals, hung at the necks of infants, are thought to act as a preservative against danger; calcined and pulverized, and taken in water, it gives relief to patients suffering from griping pains and affections of the bladder.

At the present day pointed pieces of coral are worn hung round the neck at Naples, as amulets against the malignant influence of the evil eye (*malocchio*).

It has been said that coral was never used by the ancients for glyptic purposes, either in relief or intaglio. An antique carved head of Jupiter in coral was lately in the possession of Mr. Phillips, in Cockspur Street. From its character and pattern it is said to be undoubtedly Greek of the best period. It was found in Greece by the Duke of St. Albans. An intaglio in this material is in Mr. Maskelyne's Collection.

The gorgonia (gorgon stone), mentioned by Pliny, was another name for coral.

### Margarita.—Pearl.

Theophrastus gives but a brief notice of the pearl. He writes: "To the number of gems held in esteem belongs that called the margarita, not transparent in its nature. Necklaces of great value are made out of it. It is produced in a kind of oyster, and in like manner, in the pinna. It is found in India, and on the shores of certain islands in the Red Sea."

Athenæus and Chares of Mytilene, give admirable accounts of the natural history of the pearl oyster as known to the ancients, but the fullest details, as to both fish and fishery, are to be found in the description of Parthia by Isidorus

of Charace. Pliny seems to have followed these authorities in his account of the pearl.

According to these writers the pearl-bearing oyster was found in ancient times in the Indian Sea, on the coasts of Armenia, Persia, Susiana, Babylonia, and Taprobane (Ceylon), which was then, as until lately, the seat of the most productive fishery.

The Red Sea pearls were the most transparent; the Indian, though superior in magnitude to all the others, had something of the opaque lustre of talc. Those of the best quality were distinguished by the title *exaluminatæ*, i. e. clear as a globule of alum. When larger than ordinary, the name *unio* (unique) was given them; when pear-shaped they were termed *elenchi.*

The pearl was in great esteem among the ancients. It seems to have been known from the earliest times to the Asiatic Greeks. In Pliny's time the pearls of India and Arabia were held next in esteem to the adamas, taking the precedence of the emerald and the ruby.

It was the Asiatic conquests of Pompey, Pliny tells us, that first turned the taste of the Romans towards pearls and precious stones. In his triumphal procession were carried thirty-three crowns made out of pearls, a temple of the Muses supporting a sun-dial, a portrait (bust) of the victor himself, formed out of the same precious units. Caligula wore slippers made out of pearls, and Nero had sceptres for the actors in his theatre wrought out of them. Pliny mentions having seen Lollia Paulina, the widow of Caligula, completely covered over with strings of alternate pearls and emeralds to the value of 400,000*l.* of our money.

Pliny's story is well known about the extravagance of Cleopatra, who, to outdo Antony, threw one of the two finest pearls in the world into a cup of vinegar, and when

dissolved drank it off. "It is unfortunate for this good story," Mr. King remarks, "that no acid the human stomach can endure is capable of dissolving a pearl, even after long maceration in it." The largest pearl known to Pliny weighed half a Roman ounce and one scruple over (234½ grains troy).

The word *margarita* is said to be the Greek form of the Sanscrit *maracata*, or the Persian *merwerid*.

### Murrhina.—Fluor Spar.

In Pliny's notice of *murrhina*, he first gives an account of the introduction of this material, and of vases made of it into Rome. "Pompey," he writes, "was the first who introduced *murrhina* at Rome; he being the first to dedicate, on the conclusion of his triumph, on his conquest of Mithridates, blocks (*lapides*) and cups of this material, in the temple of Jupiter Capitolinus, a circumstance which soon brought them into private use; small dishes even, and eating utensils made of *murrhina*, being in great request. This species of luxury, too, is daily on the increase; a simple cup, which would hold no more than three sextarii, has been purchased at the price of 70,000 sesterces. J. Petronius, a personage of consular rank, intending, from his hatred of Nero, to disinherit the table of that prince, broke a *murrhine* basin, which had cost him no less than 300,000 sesterces. But Nero himself, as it was only proper for a prince to do, surpassed them all by paying 1,000,000 sesterces for a single cup, a fact well worthy of remembrance," Pliny adds, "that an emperor, the father of his country, should have drunk from a vessel of such costly price."

He then describes the material itself, of which these costly vases and cups were made: "The East sends us

*murrhina* (the pieces in the rough). They are found in several places, all little known, within the Parthian dominions, principally, however, in Carmania. They are supposed to be formed of a moist substance solidified by subterraneous heat. In superficial extent, they never exceed that required for small dishes (*abaci*). In thickness they are rarely large enough for a drinking cup, as those already mentioned. The polish they take is without strength, being rather a gloss or lustre than a brilliant polish. But their value lies in the variety of their colours —the veins or strata winding around here and there, presenting hues of purple and white, and a third colour made up of both, which assumes a fiery tint, as if by the passage of the colour through the purple, or that the milky-white colour assumes a ruddy glow. Some especially admire in them the ends or boundaries of the colours,[7] and a certain play of colours, such as is seen in the rainbow. To others the opaque spots or strata are more agreeable, any transparency or paleness in them is considered a defect. *Murrhina* exhibit also crystals and warts, not prominent, but frequently, as if embedded in the substance itself. There is some recommendation also in the agreeable odour."

Much discussion has arisen in regard to the identification of the stone. Many are the substances with which it has been connected, porcelain, glass, jade, agate, china agate, onyx, but the discovery lately of some blocks of fluor spar has, we think, settled the question, and has led to its final identification with that material. It was long supposed that fluor spar was unknown to the Romans, but the blocks lately found at the Marmorata, at

[7] Not the edges of vases, as understood by some writers. Pliny is here speaking of the pieces in the rough.

Rome, prove that it was largely imported at the time of Hadrian.

I shall now make a few remarks on the above notice, and then enter more fully into the subject of its identification with fluor spar. Pliny begins his description of *murrhina*, by saying, "The East sends us *murrhina*." Here he evidently means the material itself, the pieces in the rough, and not vases and vessels, as generally understood. Hence we see that *murrhina* was brought to Rome in the rough, and then wrought up into dishes and bowls. Pliny's supposition, that it is found of a moist substance, solidified by subterraneous heat, is only the same as is put forward by ignorant lapidaries at Catania, at the present day, who say that the alabaster found under Mount Etna is snow solidified by intense heat.

We come now to its identification with fluor spar.

Among the marbles lately discovered at Rome, at the Marmorata (the site of the ancient Emporium), by Signor Visconti, are eight blocks of fluor spar. Through the kindness of Mr. Shakespere Wood, the author obtained a specimen of it, which was given to him by Cardinal Antonelli. Another piece was, some years ago, in the possession of a dealer in antiquities, Rolli, who gave out that he found it in digging the foundations of a house, but it is now known he stole it from the Marmorata. This was sold to the Jesuits, who had it cut up into thin slices, and had the front of their altar in the Chiesa del Jesu ornamented with it.

Specimens of both are in the possession of the author. The smaller specimens are from the block discovered by Rolli, and obtained by him from Sibilio of the Piazza di Spagna, to whom was entrusted the cutting up of the block for the altar. A larger specimen is from the late discovery

by Signor Visconti, and obtained, as already mentioned, from Cardinal Antonelli, by whose orders the blocks have been placed in the vaults of the Vatican, to be used at some future time for the decoration of chuches.

This discovery is of great importance, as it not only proves that fluor spar was known to the Romans, but also as it leads to the identification with the *murrhina* of Pliny. These blocks evidently came from the East, as they were found with blocks of Oriental marble in the Emporium.

The specimens in the possession of the author have been pronounced by Mr. Maskelyne to be true fluor spar, with a white stratum of hornstone winding through it. It fully answers the description of Pliny. It exhibits zones of purple with veins of opaque white (hornstone) running through it. In some parts it assumes a reddish, fiery hue. A slight iridescence frequently occurs in different parts of it. Further, fluor spar never takes a high polish, and is remarkable for the beauty and variety of its colours—purple, violet, red, blue, green, yellow, and the winding of these various zones of colours. The *purpura* of Pliny was evidently a violet tint, such as is found as a prevailing colour in fluor spar, as he applies the same term to the amethyst. If the word *sales* in Pliny can be translated *crystals*, it would further confirm the identity of *murrhina* and fluor spar, as fluor is characterized by its crystallizing in regular cubes. The odour is evidently from the rosin, which was put round it when working it, as at the present day, to prevent it from breaking, as it is of a soft and brittle nature. Propertius's expression, "Murrheaque in Parthis pocula cocta focis," strengthens the proof of its identity, as at the present day fluor spar is baked to enhance the beauty of the colours, particularly the red.

The blocks of fluor spar found at the Marmorata were

evidently brought to Rome for the purpose of being wrought up into dishes and bowls for the luxurious Romans.

An objection has been made to this identification of the *murrhina* with the fluor spar found at Rome on account of the magnitude of the blocks discovered at the Marmorata, for Pliny says, "In superficial extent (the pieces) never exceed that required for small dishes. In thickness they are rarely large enough for a drinking-cup." This objection is not, however, a strong one, as the blocks of *murrhina* introduced into Rome by Pompey, and noticed by Pliny, must have been at that time very rare, and of small size; but at the time of Hadrian, the date of the blocks, according to the consulate (SERVIANO III. COS) marked on one of the blocks of marble found with the fluor spar at the Marmorata, in A.D. 134, the demand must have been greater, and consequently the importation more extensive and the blocks introduced of greater size.

A further objection has been made that no remains of vases of fluor spar have been found at Rome. Corsi mentions two antique vases found in Rome, one in the Museo Kircheriano, which he says so completely answered the description of the *murrhina* that it seems as if it had been in the hands of Pliny, when he wrote his description of that material; another in the possession of Signor Gillet Lamont.

The discovery of these blocks of fluor spar shows that this substance must have been known to the Romans, and consequently we ought to have some description of it in Pliny, as he has described every gem and stone known to the Romans of that period. Now there is no description in his work that answers better that of fluor spar than his description of *murrhina*.

Mr. Maskelyne has noticed the great resemblance little glass Roman vessels exhibit in their pattern to fluor spar.

If these glass vessels are the false *murrhina* mentioned in Pliny and other writers, it affords an additional proof of the identity of fluor spar with the true *murrhina*.

Some consider the *murrhina* to be agate. Numerous specimens of agate cups have been frequently found, but none answering the description of the *murrhina* of Pliny occur in any cup or bowl, or in any broken fragments often to be met with. Further, agate was well known long before the introduction of *murrhina* by Pompey as a distinct class of stone, to which the name onyx or onychina were generally applied, and was largely imported from India, whereas the *murrhina* came from Parthia, and more especially from Carmania. Onyx and *murrhina* are mentioned by the author of the Periplus (age of Augustus) as two distinct substances, and as being brought from Ozene (Ougein) to Barygaza (Broach) for exportation. Ozene must have been an emporium for valuable stones, to which the *murrhina* of Parthia and Carmania were brought. A similar distinction also occurs in Seneca, when he speaks of the wealthy having "mules to carry their vases of crystal, *murrhina*, and those carved by the hands of famous artists," meaning by the latter vases of agate or onyx, which were carved by famous artists, the so-called cup of the Ptolemies affording an example of one of these. In the passage of Lampridius also, "*in murrhinis et onychinis minxit*," the *murrhina* (fluor spar) and onychina (agate) are clearly distinguished. The ancient writers could not have been so inaccurate and careless as to divide the well-known stones of the agate kind into onyx and *murrhina*, and to give such different descriptions of the same stone. They could not have had such little discrimination as to describe the same stone in one place under the name of onyx, and in another under that of *murrhina*.

But the strongest objection to the view of its being agate is the passage of Pliny, where he mentions that a consul gnawed the edges of a vase of *murrhina*, and the injury done to it by his teeth only tended to enhance its value. This shows that the *murrhina* was of the soft and brittle nature of fluor spar, and not a hard siliceous substance like agate, which no teeth could abrade.

We may also add Dr. Billing's words: "As it is recorded that the *murrhina* vases were introduced first by Pompey, from his Parthian expedition, they could not be agate, which was common *before* his time; hence *murrhina* must not be interpreted agate. It is a remarkable corroboration of this opinion that, although fluor spar is such a rare mineral, it has been seen by a modern traveller in the neighbourhood of the Caspian Sea, just the locality of the Parthian expedition."

This view is further confirmed by the observation of the author of the article on Precious Stones in the *Edinburgh Review*,[6] that the *murrhina vasa* were "like onyx, but were not onyx." In this he is so far correct that the zones and winding strata of fluor spar bear a kind of resemblance to those of agate or onyx. He adds: "they came with onyx from the Nerbudda, as related by the author of the Periplus." This author says they came from Ozene (Ougein), which is nearly 100 miles from the Nerbudda, and divided from it by the Vendhya Mountains. Ozene was doubtless, as we said before, an emporium to which the *murrhina* of Parthia (*murrhina in Parthis pocula cocta focis*) were brought, to be forwarded thence to Barygaza (Broach) for exportation to Rome.

Everything points out a distinct difference between onyx

[6] July, 1866, p. 253.

and *murrhina*. They were not only different in their nature, for the onyx is a hard, siliceous stone, and the *murrhina* soft and easily scratched, as we must infer from Pliny's account of the consul gnawing the edges of a cup of this material, and leaving the marks of his teeth on it; but also in the localities from whence they came. The onyx came from India and Arabia, the *murrhina* from Parthia and Carmania.

*Murrhina* was evidently considered by the Romans as a rare stone, distinct in its nature from every stone known to them hitherto. It is classed apart by Pliny. Before entering on his description of gems and precious stones he gives an account of *murrhina*, crystal and amber, as distinct substances from those he was going to treat of, evidently placing them in a class apart from those generally known as precious stones, among which agate (onyx) is placed.

Lastly *purpura* (purple or violet) never appears in agates. It has, however, been asserted that the *purpura* of the ancients was of a crimson hue inclining to maroon. There is no authority for this assertion. The *purpura* of Pliny was evidently of a violet or amethystine hue. Among the stones of the colour of *purpura* he includes the amethysts of India. Further on he mentions the amethysts of India as having in perfection the richest shade of purple. In Book ix. cap. 68, Pliny mentions that Cheper, who died in the reign of the Emperor Augustus, has left the following remarks: "In the days of my youth the violet purple was in favour, a pound of which used to sell at one hundred denarii." All tends to show that the *purpura* of Pliny was of a rich violet amethystine hue, such as is one of the predominant colours of fluor spar.[7]

[7] According to Sir Gardner Wilkinson ("Rawlinson's Herodotus," ii. 347) the best purple was amethyst or violet colour.

## Onyx.—Oriental Alabaster.

The name onyx was originally, and sometimes in Pliny's time, as he tells us, given to the marble (Oriental alabaster, carbonate of lime). At a later period the term onyx was restricted to the gem so called at the present day; and the name alabastrites was applied to the marble from its being chiefly employed for alabastra, or unguent jars, it having, according to Pliny, the reputation of preserving unguents from corruption. These alabastra were shaped like minute amphoræ, but without handles. The Greeks, however, made a more careful distinction in the appellation of the two stones, giving the name of *ὀνύχιον* to the gem, and of *ὀνύχιτις* to the marble.

According to Pliny, onyx (Oriental alabaster) is found in the vicinity of Thebes in Egypt, and of Damascus in Syria, that of Damascus being whiter than the other. The most esteemed kind, however, is that of Carmania, the next being the produce of India, and then those of Syria and Asia. The worst in quality is that of Cappadocia, it being utterly destitute of lustre. That which is of a honey colour is the most esteemed, covered with spots curling in whirls (*vortices*), and not transparent. It is considered defective, when it is of a white or horn colour, or approaching to glass in appearance. Drinking vessels were made of it at first, and then the feet of beds and chairs. Cornelius Nepos relates that great was the astonishment when P. Lentulus Spinther exhibited amphoræ made of this material as large as Chian wine vessels, "and yet, five years after," he says, "I saw columns of this material no less than thirty-two feet in height." Four small pillars of it were erected by Cornelius Balbus in his theatre, as something quite marvellous,

and thirty columns of larger size were erected in the banqueting-room of Callistus.

St. Mark's "alabaster box of ointment" (*ἀλαβάστρον μύρου νάρδου*), and Horace's "nardi parvus onyx" were of this material.

In the passage of Propertius,—

> "Et crocino nares murrheus ungat onyx"
>
> (L. iii. El. x.)

the "murrheus onyx" is evidently also alabaster, the epithet "murrheus" being added, from the resemblance of this onyx in its winding zones and layers to those of the *murrhina* or fluor spar. The ointment was sealed up in small alabaster jars. They were never to be opened, but to let the scent escape slowly and sparingly through the porous stone. From the above passage it would appear that the ointment exuded through the porous alabaster, and anointed the nostrils. The Egyptian squat jars, generally termed *canopi*, which contained the principal intestines of the mummy they are found in connexion with, are generally of this material. In Sir John Soane's Museum is a sarcophagus cut out of a single block of Oriental alabaster; it is covered inside as well as outside with hieroglyphics. In the museum of the Vatican are some magnificent vases and baths of this beautiful stone.

Superb examples of the magnificence of Callistus in using columns of this beautiful material are still preserved in some of the older Roman churches, relics of the times alluded to by Pliny, but none have ever approached to the magnitude of those presented by Mohammed Ali to the new fabric of St. Paolo fuori le Mura, columns and pilasters, forty feet long, each of a single block and the most beautiful quality. Under this Pasha the ancient Egyptian quarries

had been reopened, and furnished the material of which his sumptuous mausoleum at Cairo is exclusively constructed, a piece of extravagance beyond the ambition of even Nero.[8]

### Basanites.—Basalt.

"The Egyptians," Pliny writes, "have discovered in Æthiopia the stone known as 'basanites,' which in colour and hardness resembles iron, whence the name has been given to it. A larger block of it has never been known than the one forming the group which has been dedicated by the Emperor Vespasianus Augustus in the Temple of Peace. It represents the river Nilus, with sixteen children sporting around it, symbolical of the sixteen cubits, the extreme height to which, in the most favourable seasons, that river should rise."

The basanites described here by Pliny is the stone known at the present day under the name of basalt, an igneous rock of a deep black, but showing a tinge of green when viewed at a certain angle, and of an extremely fine grain.

Intagli and scarabæi of a very late period among the Egyptians are to be met with of this material. There are also some Gnostic amulets of this stone. It was frequently employed for statues by the Egyptians, and by the Romans of the age of Hadrian.

Basalt was also known as *Marmor Thebaicum*.

### Porphyrites Leptosephos.—Porphyry.

The porphyrites leptosephos, which Pliny describes "as the production of Egypt, and of a red colour mottled

[8] C. W. King, "Natural History of Gems," p. 24.

with white blotches," is undoubtedly porphyry, a stone of a dark crimson ground, thickly disseminated with white crystals of felspar. Pliny further states that the quarries in Egypt are able to furnish blocks of any dimensions, however large.

Talismanic intagli of a late Roman date occasionally occur in this stone.

Under the Lower Empire it was largely employed in the most sumptuous edifices then erected, in the forms of columns, of *labra* for baths, and of sarcophagi.

The Sarcophagus of the Empress Helena in the Vatican is made out of a single block 19½ palms high by 12 long (13 × 8 feet) of this stone, of the finest texture and deepest colour. The sarcophagus of Constantia, daughter of Constantine, is also cut out of a single block of the same stone (7½ × 5⅓ feet).

The lower parts of later Imperial busts, having the head alone in white marble or bronze, were occasionally carved of this material.

It was also employed by Italian artists at the Revival.

The porphyrites of Pliny is the red marble known among the fragments found at Rome as *rosso antico.*

## Ophites.—Serpentine.

The ophites marble, which Pliny describes as marked with white streaks, which resemble serpents in appearance, and which derives its name from this, is identified with the serpentine so frequently met with among Roman ruins, and which has been termed *serpentino antico.* It is of a dark dull-green colour, with long, whitish spots.

Egyptian scarabæi, bearing hieroglyphics, frequently

occur of this material. Gems of a late Roman period are sometimes met with in serpentine.[9]

### Syenites.—Granite.

"In the neighbourhood of Syene," Pliny says, "in Thebais, there is a stone found that is now known as syenites, but was formerly called pyrrho-pæcilon." This can be no other than the well-known Egyptian stone, granite, a primitive rock whose constituent parts are felspar, quartz, and mica. This red or Egyptian variety of granite (the red felspar predominating) was principally used by the Egyptians for their statues and obelisks. "Monarchs," Pliny writes, "have entered into a sort of rivalry with one another in forming elongated blocks of this stone, known as obelisks, and consecrated to the divinity of the sun."[1]

The variety of granite called at the present day syenite is composed of felspar, quartz, and hornblende. Though

[9] A portion of an ancient dish, found at Ostia, of antigorite (serpentine), is in the possession of the author.

[1] "The hieroglyphics in the obelisks are rather engraved than sculptured, and, judging from the minute manner in which they are executed, we may suppose they adopted the same process as engravers, and even, in some instances, employed the wheel and drill. That they were acquainted with the use of emery powder is not at all improbable, since, being found in the islands of the Archipelago, it was within their reach; and if this be admitted, we can account for the admirable finish and sharpness of the hieroglyphics on granite and basaltic monuments, and explain the reason of their preferring tools of bronze to those of harder and more tempered steel, for it is evident the powder enters more readily into the former, and its action upon the stone is increased in proportion to the quantity retained by the point of the chisel, whence we prefer tools of soft iron to hard steel for the same purpose."—Sir Gardner Wilkinson, "Ancient Egyptians," vol. ii. p. 157.

deriving its name from Syene, in Egypt, but little of it is met with in that place, the rock there being chiefly granite.

The syenites of antiquity was the red Egyptian granite of Syene. It was the λίθος Αἰθιοπικὸς ποικίλος of Herodotus.

The large masses of granite from Syene for obelisks do not appear to have been conveyed to the lower parts of Egypt by the river Nile. They were taken by land. Herodotus, in mentioning one of the largest blocks ever cut by the Egyptians, says it was conveyed from Elephantine, or rather Syene, by land, during the reign of Amasis, to the vicinity of Sais, and that it employed 2000 men for three years.

The Egyptians were the only people who engraved small objects in granite. Scarabæi bearing hieroglyphics of this material are frequently met with.

# CATALOGUE

OF

# GEMS AND PRECIOUS STONES

IN THE

TOWNSHEND COLLECTION, SOUTH KENSINGTON MUSEUM.[1]

1172. DIAMOND. In the native state; an octahedral crystal, with the curved faces and the edges replaced, passing into a dodecahedron; diam. $\frac{1}{3}$ in.; in claw setting on a swing mount.

1173. Black Diamond. Nearly circular; brilliant cut; diam. $\frac{1}{4}$ in.; surrounded with fourteen small rose diamonds in coronet mounting.

1174. Brilliant. Nearly circular, diam. $\frac{5}{12}$ in. Silver setting on chased gold shank.

1175. Green Brilliant. Round; diam. $\frac{1}{4}$ in.; surrounded with twelve brilliants, double cut; set in silver on a gold mounting.

[1] This Catalogue is adapted, by permission, from that prepared by Mr. James Tennant for the Science and Art Department, with the mistakes corrected.

1176. Sea-green Diamond. Brilliant cut ; $\frac{5}{16}$ in. by $\frac{1}{4}$ in. ; with a rose diamond on each of the six points of the coronet setting.

1177. Yellow Diamond. Circular ; diam. $\frac{5}{12}$ in., with eight rose diamonds, one on each point of the coronet setting.

1178. Pale Puce Diamond. Brilliant cut ; $\frac{3}{16}$ in. by $\frac{1}{8}$ in. ; surrounded with twelve small brilliants, set in silver on the open-work mounting.

1179. Blue Diamond. Brilliant cut ; $\frac{9}{16}$ in. by $\frac{7}{16}$ in. ; surrounded with 12 + 6 = 18 brilliants.

1180. Rock Crystal. Circular ; brilliant cut ; diam. $\frac{1}{2}$ in.; on a coronet mount with silver claws.

1181. Smoky Quartz. Octagonal ; cushion-cut face; back facetted ; $\frac{10}{12}$ in. by $\frac{9}{12}$ in. ; coronet mount.

1182. Pale Yellow Quartz. Face with table and step-facets ; culet pointed, and culet-side facetted ; $\frac{5}{6}$ in. by $\frac{9}{12}$ in., and $\frac{5}{6}$ thick ; on coronet mounting.

1183. Oval Yellow Quartz. Table cut ; back facetted ; 1 in. by $\frac{3}{4}$ in. ; in a claw mount.

1184. Oval Yellow Quartz. Face with table, and facetted bezel ; back with facets, and a pointed culet ; $1\frac{1}{4}$ in. by $1\frac{1}{2}$ in., and $\frac{7}{12}$ in. thick ; in coronet mount.

1185. Yellow Quartz, with a feather. Oblong, cushion-cut with steps ; large facets on the back; $1\frac{2}{12}$ by $1\frac{1}{2}$ in., and $1\frac{1}{2}$ in. thick ; coronet-mounted handle.

1186. Twin Stone of Pale Yellow and Purple Quartz. Each half long-oval, facetted, and $\frac{17}{24}$ in. by $\frac{1}{3}$ in.; set in a plain mount.

1187. Oval Biconvex Amethyst. Containing four large cavities with movable fluid and floating bubbles ; 1 in. by $\frac{3}{4}$ in., and $\frac{7}{8}$ in. thick ; in a plain swing mount.

1188. Oval Amethyst. Cushion-cut ; $\frac{1}{2}\frac{5}{4}$ in. by $\frac{1}{2}\frac{1}{4}$ in. ; in a coronet mounting.

1189. Heart-shaped Amethyst. Facetted on face and back ; $\frac{1}{1}\frac{1}{2}$ in. by $\frac{1}{1}\frac{1}{2}$ in. ; in coronet mount.

1190. Deep-coloured Oval Amethyst. Face cushion-cut ; back facetted; 1 in. by $\frac{5}{6}$ in., and $\frac{1}{2}$ in. thick ; in coronet mounting.

1191. Amethyst. Rich in colour, and striped ; cushion-cut face; facetted back; $1\frac{1}{1}\frac{1}{2}$ in. by $\frac{2}{2}\frac{3}{4}$ in., and $\frac{1}{2}$ in. thick ; in a coronet mount.

1192. Amethyst. Indian ; of a delicate tint ; table-cut, and facetted ; back cut in steps ; $\frac{1}{2}$ in. by $\frac{1}{4}$ in. ; surrounded with thirty-seven rose diamonds.

1193. Pale Yellow Quartz. Carved as a monkey's head, with a rosy tint in the nose ; $\frac{1}{3}$ in. by $\frac{7}{2}\frac{}{4}$ in. ; in a plain mount.

1194. Chrysoberyl. Light yellowish green ; brilliant cut ; $\frac{6}{8}$ in. by $\frac{5}{8}$ in. ; coronet mount.

1195. Quartz. Of a deep wine colour, oval ; table-cut ; back facetted ; $\frac{1}{1}\frac{1}{2}$ in. by $\frac{2}{3}$ in., and $\frac{5}{1}\frac{}{2}$ in. thick ; coronet mount.

1196. Plasma. Oval ; engraved with a Cupid holding a butterfly over a torch ; $\frac{5}{1}\frac{}{2}$ in. by $\frac{1}{3}$ in.; in a plain mount.

1197. Plasma. Oval ; engraved with a Cupid resting on a staff ; $\frac{1}{3}$ in. by $\frac{1}{4}$ in. ; coronet mount.

1198. Plasma. Long oval ; engraved with two female figures, $\frac{1}{2}\frac{1}{4}$ in. by $\frac{1}{3}$ in. Plain mounting.

1199. Chrysoprase. Oval-face ; table-cut ; back rounded ; $\frac{1}{1}\frac{1}{2}$ in. by $\frac{2}{3}$ in. ; solid plain mount.

1200. Chrysoprase. Oval; engraved in high relief with a laurel-wreathed head ; $\frac{1}{1}\frac{3}{2}$ in. by $\frac{9}{1}\frac{}{2}$ in. ; plain mount.

1201. Chrysoprase. Nearly circular; diam. $\frac{1}{3}$ in.; in plain mount.

1202. Chrysoprase. Oval; cut en cabochon; $\frac{1}{4}$ in. by $\frac{5}{24}$ in.; in a solid chased mounting.

1203. Chrysoprase. Oval; cut en cabochon; $\frac{15}{24}$ in. by $\frac{7}{12}$ in.; in a coronet mounting.

1204. Sapphirine. Oval; convex, engraved with an Olympian Zeus; $\frac{1}{2}$ in. by $\frac{5}{12}$ in.; in a coronet mounting.

1205. Amazon Stone. (Orthoclase Felspar.) Oval; $\frac{3}{4}$ in. by $\frac{5}{12}$ in.; in a plain mount.

1206. Agate. Oval; white, with a patch of brown, somewhat resembling the shape of a female head; $\frac{5}{6}$ in. by $\frac{9}{12}$ in.; in a coronet mounting.

1207. Agate. Oval; light brown, with some concentric lines; $\frac{11}{12}$ in. by $\frac{9}{12}$ in.; perforated with two holes; in coronet mounting.

1208. Amethyst and Chalcedony. Oval; in an octagonal setting; $\frac{10}{12}$ in. by $\frac{7}{12}$ in. The flat face has a brownish-white (speckly) chalcedonic layer cut into a Panther, and a narrow border; the convex back of amethyst is engraved with a Bacchante; mounted as a double swing ring.

1209. Onyx. $\frac{9}{16}$ in. by $\frac{5}{12}$ in.; plain mount.

1210. Eye-Onyx. Hemispherical; diam. $\frac{1}{2}$ in.; in coronet mounting.

1211. Sardonyx. Oval; brown, white, and black; $\frac{2}{3}$ in. by $\frac{7}{12}$ in.; in plain solid mount.

1212. Sard. Nearly square; flat, engraved with Oriental characters, decorated with foliage; $\frac{3}{4}$ in. by $\frac{2}{3}$ in.; in a plain mounting.

1213. Moss Agate. Oval; purplish; $\frac{1}{2}$ in. by $\frac{5}{12}$ in.; in coronet mounting.

1214. Mocha Stone. 1 in. by $\frac{19}{24}$ in.; claw mounting.

1215. Mocha Stone. Oval; grey; 1 in. by $\frac{3}{4}$ in.; in plain light mounting.

1216. Heliotrope. Oval; flat; $\frac{11}{24}$ in. by $\frac{9}{24}$ in.; plain mounting.

1217. Cat's Eye. Honey yellow; cut en cabochon; $\frac{3}{4}$ in. by $\frac{9}{24}$ in., and $\frac{5}{12}$ in. thick; coronet mounting.

1218. Cat's Eye. Brownish; cut en cabochon; $\frac{3}{12}$ in. by $\frac{1}{3}$ in.; plain mount.

1219. Cat's Eye. Brownish; cut en cabochon and hollow; $\frac{23}{24}$ in. by $\frac{8}{12}$ in.; surrounded by twenty brilliants, and with several roses on the pierced shoulders; all set in silver on a gold shank.

1220. Precious Opal. Harlequin; heart-shaped; $\frac{12}{16}$ in. by $\frac{9}{16}$ in.; surrounded with forty-six diamonds; in open-work mounting.

1221. Precious Opal. Oval; $\frac{6}{8}$ in. by $\frac{4}{8}$ in.; surrounded with thirty-four diamonds.

1222. Precious Opal. Long pear-shaped; $\frac{7}{12}$ in. by $\frac{4}{12}$ in.; in open, blue-enamelled coronet setting; surrounded with twelve brilliants.

1223. Precious Opal. Oval; $\frac{9}{16}$ in. by $\frac{7}{16}$ in.; surrounded with twenty-four brilliants; plain mounting.

1224. Precious Opal. Oval; $\frac{1}{3}$ in. by $\frac{5}{24}$ in.; surrounded with sixteen rose diamonds; in open-work mounting.

1225. Precious Opal. Long oval; $\frac{2}{3}$ in. by $\frac{6}{16}$ in.; in claw setting, with blue enamel.

1226. Fire Opal. Long oval; $\frac{2}{3}$ in. by $\frac{5}{12}$ in.; with blue enamel border on the gold setting.

1227. Fire Opal. Circular; diam. $\frac{5}{12}$ in.; coronet mount, on carved shank.

1228. Precious Opal. Oval; $\frac{11}{16}$ in. by $\frac{9}{16}$ in.; plain mounting, with claws.

1229. Precious Opal. Oval; $\frac{1}{2}$ in. by $\frac{5}{6}$ in.; plain mount.

1230. Precious Opal. Oval; pale pinkish-grey; $\frac{3}{4}$ in. by $\frac{7}{12}$ in.; in a light open coronet mounting.

1231. Precious Opal. Ovate; light purple; $\frac{1}{2}$ in. by $\frac{1}{3}$ in.; in simple mounting.

1232. Precious Opal. Oval; part white, part brown; $\frac{1}{2}$ in. by $\frac{6}{16}$ in.; in open-work setting.

1233. Opal. Oblong oval; dark brown; with play of green colour; $\frac{13}{16}$ in. by $\frac{5}{8}$ in.; coronet mounting.

1234. Opal. Heart-shaped; blue and grey; diam. $\frac{1}{2}$ in.; plain mounting.

1235. Semi-opal. Nearly hemispherical; yellow, dendritic; $\frac{3}{4}$ in. by $\frac{5}{8}$ in.; open-work mount.

1236. Semi-opal. Circular; yellow; facetted; diam. $\frac{7}{24}$ in.; plain open mounting.

1237. Lumachelle (Fire Marble). Oval; flat; 1 in. by $\frac{3}{4}$ in.; in a coronet mounting.

1238. Sapphire. Long oval; en cabochon, prismatic by a flaw; $\frac{13}{24}$ in. by $\frac{6}{16}$ in.; in coronet setting.

1239. Sapphire. Deep blue; $\frac{5}{12}$ in. by $\frac{5}{16}$ in.; set with three brilliants and four small diamonds.

1240. Sapphire. Circular; blue; diam. $\frac{7}{16}$ in.; set with two pear-shaped brilliants, and ten small brilliants.

1241. Sapphire. Deep blue; globose oval; $\frac{9}{16}$ in. by $\frac{7}{16}$ in.; in plum mounting, with claws.

1242. Sapphire. Deep blue; egg-shaped; table-cut on face; facetted on back; $\frac{3}{4}$ in. by $\frac{1}{2}$ in., and $\frac{9}{16}$ in. thick; in coronet mount.

1243. Star Sapphire. En cabochon; oval; $\frac{1}{2}$ in. by $\frac{6}{16}$ in.; in a plain mount.

1244. Star Sapphire. With silky lustre; octagonal; en cabochon; $\frac{25}{32}$ in. by $\frac{21}{32}$ in.; surrounded with forty-seven small diamonds.

1245. Star Sapphire. Hemispherical; pale blue; diam. $\frac{1}{2}$ in.; surrounded with two circles of diamonds.

1246. Star Sapphire. Nearly hemispherical; diam. $\frac{9}{16}$ in.; in coronet mounting.

1247. Violet Sapphire (Oriental Amethyst). Octagonal-oblong, facetted; $\frac{7}{16}$ in. by $\frac{3}{8}$ in.; surrounded with forty diamonds.

1248. Sapphire. Amethystine. Cushion-cut; $\frac{5}{12}$ in. by $\frac{6}{16}$ in.; in coronet mounting.

1249. Ruby. Nearly square; $\frac{1}{4}$ in. by $\frac{3}{16}$ in.; surrounded with brilliants; open-work mounting.

1250. Star Ruby. Pale; hemispherical; diam. $\frac{7}{16}$ in.; plain mounting, with claws.

1251. Star Ruby. Oval, en cabochon; $\frac{13}{24}$ in. by $\frac{1}{2}$ in.; surrounded with thirty-three diamonds; open-work mounting.

1252. Ruby. Sub-ovate; $\frac{3}{8}$ in. by $\frac{2}{8}$ in.; surrounded with twelve diamonds; coronet mount.

1253. Ruby. Oblong; cushion-cut; $\frac{1}{2}$ in. by $\frac{7}{10}$ in.; surrounded with twenty-four diamonds; open-work mounting.

1254. Ruby. Oblong; cushion-cut; $\frac{7}{16}$ in. by $\frac{5}{16}$ in.; surrounded with twenty-four diamonds; open-work mount.

1255. Ruby. Circular; facetted; diam. $\frac{5}{16}$ in.; surrounded with twenty diamonds; open-work mounting.

1256. Yellow Sapphire (Oriental Topaz). Oval-oblong; cushion-cut; $\frac{1}{2}$ in. by $\frac{6}{16}$ in., and $\frac{6}{16}$ in. thick; coronet mount.

1257. White Sapphire (Lux Sapphire). Octagonal; diam. $\frac{17}{32}$ in.; light coronet mount.

1258. Chatoyant Sapphire. Translucent, brown chatoyant, with a patch of grey light at one end, and iri-

descent by a flaw; en cabochon; $\frac{8}{12}$ in. by $\frac{7}{12}$ in.; in coronet mount.

1259. Sapphire. Wine-coloured; translucent; en cabochon; $\frac{3}{8}$ in. by $\frac{5}{16}$ in.; surrounded with sixteen rose diamonds; on a swing mount.

1260. Sapphire. Salmon-coloured; translucent; oblong; $\frac{7}{16}$ in. by $\frac{5}{16}$ in.; surrounded with thirty-four diamonds; plain mounting.

1261. Turquoise. Circular; of greenish tint; $\frac{5}{12}$ in. diam.; cut with a female head in relief; solid mount.

1262. Turquoise. Rich blue; oval; en cabochon; $\frac{1}{2}$ in. by $\frac{9}{24}$ in.; surrounded with thirty-four diamonds.

1263. Turquoise. Oval; en cabochon; $\frac{1}{3}$ in. by $\frac{1}{4}$ in.; set round with fourteen brilliants in open-work mount.

1264. Turquoise. Oval; en cabochon; $\frac{5}{22}$ in. by $\frac{7}{24}$ in.; in a thick plaited ring.

1265. Turquoise. Oval; deep blue; nearly flat; $\frac{1}{2}$ in. by $\frac{9}{24}$ in.; solid mount.

1266. Turquoise. Heart-shaped; inlaid with a narrow border and numerous irregular lines of gold; $\frac{3}{4}$ in. by $\frac{1}{2}$ in.; in coronet mount.

1267. Kyanite. Pale violet, with oblique lines of cleavage; oval; en cabochon; $\frac{1}{2}$ in. by $\frac{5}{12}$ in.; in light claw mount.

1268. Kyanite. Pale blue; narrow oblong; en cabochon; $\frac{1}{2}$ in. by $\frac{1}{4}$ in.; in a plain claw mount.

1269. Carbuncle. Round; facetted; diam. $\frac{1}{4}$ in.; surrounded with nine brilliants.

1270. Carbuncle. En cabochon, and set on foil; $\frac{11}{12}$ in. by $\frac{2}{3}$ in.; in a solid claw mount.

1271. Almandine. Nearly circular; facetted; $\frac{17}{24}$ in. by $\frac{15}{24}$ in.; in a coronet mount.

1272. Almandine. En cabochon, and hollow; $\frac{10}{12}$ in. by $\frac{1}{2}$ in.; engraved with a Faun, in plain mounting.

1273. Almandine. Octagonal; face with table and facetted stone; diam. $\frac{7}{12}$ in.; in a claw mount.

1274. Precious Garnet. Brown; oblong; $\frac{13}{24}$ in. by $\frac{5}{22}$ in.; surrounded with forty-seven diamonds.

1275. Precious Garnet. Rich brown; facetted; $\frac{19}{24}$ in. by $\frac{7}{12}$ in.; in a coronet mount.

1276. Cluster of Seven Stones of Precious Garnet. In a plain mounting.

1277. Almandine. Oblong; table-cut; $\frac{11}{24}$ in. by $\frac{1}{3}$ in.; surrounded with forty-four diamonds; open-work mounting.

1278. Almandine. Scutcheon-shaped; flat; $\frac{4}{12}$ in. by $\frac{3}{12}$ in.; in a claw mount.

1279. Garnet. Deep wine-coloured; cushion-cut; $\frac{7}{8}$ in. by $\frac{23}{32}$ in.; in a coronet mount.

1280. Essonite. Square; diam. $\frac{1}{2}$ in.; in coronet mount.

1281. Essonite. Octagonal; diam. $\frac{11}{24}$ in.; in coronet setting.

1282. Essonite. Oblong; $\frac{10}{16}$ in. by $\frac{1}{2}$ in.; plain mounting.

1283. Emerald. Flat; $\frac{27}{32}$ in. by $\frac{21}{32}$ in.; engraved with Oriental characters; set in a coronet mount.

1284. Emerald. Square; set lozenge-wise; diam. $\frac{7}{16}$ in; surrounded with thirty-six diamonds.

1285. Star Emerald. Showing six rays; sub-globular, with face and back centrally flattened; diam. $\frac{1}{2}$ in.; in plain swing.

1286. Beryl. Circular; with large table, surrounded with facets; culet-side facetted in squares; diam. $1\frac{10}{12}$ in.; $1\frac{1}{6}$ in. thick; coronet mounted.

1287. Beryl. Oval; with large table and numerous facets;

back facetted; $1\frac{7}{12}$ in. by $1\frac{1}{3}$ in., and $\frac{11}{12}$ in. thick; coronet mounted.

1288. Aquamarine. Oval; with large table, and facets round it; culet-side cut with square facets; $1\frac{10}{12}$ in. by $1\frac{1}{2}$ in.; 1 in. thick; coronet mounted.

1289. Aquamarine. Long oblong; face with table and brilliant facets; back ridged and facetted with steps; $1\frac{1}{6}$ in. by $\frac{7}{12}$ in.; $\frac{5}{12}$ in. thick; in coronet mount.

1290. Aquamarine. Nearly square; $\frac{1}{2}$ in. by $\frac{11}{24}$ in.; in open coronet setting.

1291. Euclase. $\frac{4}{12}$ in. by $\frac{3}{12}$ in.; coronet mounting.

1292. Labradorite. Circular; slightly convex; diam. $\frac{7}{12}$ in.; in a claw mount.

1293. Sunstone. Oval; en cabochon; $\frac{5}{12}$ in. by $\frac{1}{3}$ in.; in solid mounting.

1294. Moonstone. Oval; cut en cabochon; $\frac{1}{2}$ in. by $\frac{5}{12}$ in.; in a plain mount.

1295. Black Tourmaline. Nearly square; cushion-cut; $\frac{1}{2}$ in. by $\frac{5}{12}$ in.; coronet mounting.

1296. Crystal of Apophyllite. Truncated pyramid; diam. $\frac{5}{24}$ in.; in a claw mount.

1297. Chrysoberyl. Nearly circular; cushion-cut; 1 in. by $\frac{5}{16}$ in.; in a coronet mount.

1298. Green Jargoon. Long oval; $\frac{10}{26}$ in. by $\frac{7}{16}$ in.; in a light plain claw.

1299. Peridot. Oval; $\frac{1}{2}$ in. by $\frac{1}{3}$ in.; plain mounting.

1300. Peridot. Diam. $\frac{8}{12}$ in.; engraved with an hermaphrodite and tree, and the name of the artist, Calandrelli, in Greek characters; plain mount.

1301. Peridot. Octagonal oblong; table-cut, with side facets; back facetted with steps; $1\frac{1}{4}$ in. by $1\frac{1}{6}$ in.; coronet mounting.

1302. Peridot. Rounded oblong; face cushion-cut; back

facetted; $\frac{10}{12}$ in. by $\frac{9}{12}$ in., and $\frac{5}{12}$ in. thick; in a solid mount.

1303. Peridot. Oblong; face slightly convex; table-cut, with one facet all round; culet and culet-side rounded, the back being barrel-shaped, with facetted ends; $1\frac{1}{4}$ in. by $\frac{11}{12}$ in., and $\frac{2}{3}$ in. thick; coronet mount.

1304. Chrysoberyl. Light yellowish green; brilliant-cut; $\frac{11}{16}$ in. by $\frac{9}{16}$; open coronet mount.

1305. Jargoon. Pale milky; $\frac{9}{22}$ in. by $\frac{1}{3}$ in.; brilliant-cut; in a plain mount.

1306. Hyacinthine Garnet. Oval; carved in high relief with bust; $\frac{13}{16}$ in. by $\frac{1}{2}$ in.; in plain mounting.

1307. Hyacinthine Garnet. Oblong; $\frac{6}{16}$ in. by $\frac{1}{3}$ in.; in light coronet setting.

1308. White Topaz. Nearly square; brilliant-cut; diam. $\frac{7}{12}$ in.; in coronet mounting.

1309. Topaz. Deep purplish pink; oblong, table-cut; $\frac{15}{24}$ in. by $\frac{1}{2}$ in.; surrounded with thirty-four diamonds; in open-work mounting.

1310. Yellow Topaz. Cushion-cut; $\frac{13}{16}$ in. by $\frac{5}{8}$ in.; surrounded with thirty-six diamonds; open-work mounting.

1311. Yellow Topaz. Narrow oblong; cut with oblong table and step-facets; culet-ridged, and culet-side in steps; $1\frac{1}{4}$ in. by $\frac{2}{3}$ in., and $\frac{5}{12}$ in. thick; coronet mount.

1312. Yellow Sapphire. Oval; $\frac{2}{3}$ in. by $\frac{1}{2}$ in.; open coronet mount.

1313. Yellow Topaz. Oblong, with slightly rounded sides; cushion-cut, with long angular facets; facetted with steps on back; $\frac{13}{16}$ in. by $\frac{11}{12}$ in., and $\frac{7}{12}$ in. thick; in coronet mount.

1314. Yellow Topaz. Octagonal oblong; step-cut; flawed with parallel cleavage-planes; $\frac{9}{16}$ in. by $\frac{6}{16}$ in.; solid mounting with four claws.

1315. Topaz. Oval; pale bright bronze; brilliant-cut; $\frac{1}{2}$ in. by $\frac{9}{24}$ in.; coronet mount.

1316. Blue Topaz. Oval; cushion-cut; back facetted; $\frac{3}{4}$ in. by $\frac{15}{24}$ in.; $\frac{11}{24}$ thick; in coronet mount.

1317. Pink Topaz. Oblong; $\frac{5}{8}$ in. by $\frac{1}{2}$ in.; surrounded with thirty-six diamonds; open-work mounting.

1318. Burnt Topaz. Oblong; cushion-cut; back facetted; $\frac{1}{2}$ in. by $\frac{5}{12}$ in.; coronet mount.

1319. Blue Tourmaline (Indicolite). Oval facetted; $\frac{1}{2}$ in. by $\frac{5}{15}$ in.; coronet mount.

1320. Red Tourmaline (Rubellite). Circular, slightly convex; facetted; flat at back; diam. $\frac{3}{4}$ in.; in a coronet mount.

1321. Green Tourmaline. Octagonal oblong; $\frac{13}{24}$ in. by $\frac{5}{12}$ in.; coronet mount.

1322. Green Jargoon. Cushion-cut face; facetted back; $\frac{7}{12}$ in. by $\frac{1}{2}$ in.; in plain claw mount.

1323. Green Tourmaline. Oblong; face cushion-cut, and facetted in steps; back with steps facetted; 1 in. by $\frac{3}{4}$ in., and $\frac{5}{12}$ in. thick; coronet mount.

1324. Lapis-lazuli. Oval, flat; $\frac{5}{12}$ in. by $\frac{9}{24}$ in.; in a solid mount.

1325. Blue Spinel. Facetted; $\frac{3}{8}$ in. by $\frac{5}{16}$ in.; surrounded with eighteen diamonds; in open-work mounting.

1326. Spinel. Oblong; cushion-cut; $\frac{7}{16}$ in. by $\frac{3}{8}$ in.; surrounded with sixty-seven diamonds; in open-work mounting.

1327. Spinel. Square; diam. $\frac{5}{6}$ in.; step-cut; surrounded with thirty-six brilliants; set lozenge-wise on a plain mount.

1328. Cymophane. Circular; en cabochon; diam. $\frac{6}{8}$ in.; surrounded with sixteen diamonds; in open-work mounting.

1329. Cymophane. $\frac{5}{8}$ in. by $\frac{9}{16}$ in.; coronet mount.

1330. Cymophane. Oval; $\frac{11}{16}$ in. by $\frac{1}{2}$ in.; surrounded with twenty-eight brilliants; in plain mount with claws.

1331. Cymophane. Greenish brown; biconvex; diam. $\frac{11}{16}$; coronet mount.

1332. Cymophane. Oval; en cabochon; $\frac{17}{24}$ in. by $\frac{7}{12}$ in.; plain mount.

1333. Cymophane. Dark green; $\frac{1}{2}$ in. by $\frac{5}{12}$ in.; coronet mount.

1334. Malachite. Hemispherical; diam. $\frac{1}{2}$ in.; coronet mount.

1335. Marcasite. Heart-shaped; facetted; $\frac{1}{2}$ in. by $\frac{1}{3}$ in.; light coronet mounting.

1336. Crocidolite. Dark bluish green; oblong; en cabochon; $\frac{9}{12}$ in. by $\frac{7}{12}$ in.; coronet mount.

1337. Pearl. Diam. $\frac{5}{12}$ in.; set with brilliants.

1338. Black Pearl. Round; diam. $\frac{5}{6}$ in.; plain mounting with claws.

1339. Pink Pearl. Diam. $\frac{1}{3}$ in.; in claw setting.

1340. White Pearl. Short-ovate; diam. $\frac{1}{4}$ in.; held by four claws.

# ANTIQUE GEMS

IN THE

# BLACAS COLLECTION, BRITISH MUSEUM.

## Cameı.

The bust of Augustus, with the ægis on the breast. A cameo of an oval form, measuring $5\frac{1}{4}$ in. by $3\frac{5}{8}$ in. A sardonyx of three layers. Formerly in the Strozzi Collection.

Augustus, with the Capricorn, the sign of the nativity of this Emperor. Onyx cameo.

Julia, the daughter of Augustus, crowned with poppies. Onyx of three layers.

The young Germanicus. Onyx cameo of two layers, inscribed ΕΠΙΤΥΓΧ.

Claudius Drusus, full-face. Cameo on onyx.

Bust of the young Tiberius, full-face. Onyx of two layers.

Head of Drusilla, sister of Caligula. Onyx of three layers.

Bust of the Empress Messalina. Fragment of a large onyx cameo of three layers.

Head of Claudius. Onyx of three layers.

Bust of Elagabulus. Onyx of three layers.

Bust of Carus. Onyx of three layers.

Bust of the elder Licinius, full-face, in high relief. Onyx, two layers.

Busts of Ptolemy Philadelphus and Arsinoe ; or probably portraits of a king and queen of the Macedonian period. Onyx of two layers.

Victory in a quadriga. Circular onyx of three layers, and nearly two inches in diameter.

Pallas Athene in a *biga*, on her shield the Gorgon. Oval onyx of three layers.

Satyr dancing, brandishing a thyrsus. Oval onyx, three layers.

Head of Medusa, cut out of an amethyst, measuring $2\frac{1}{2}$ in. by 2 in.

Victory driving a quadriga. Oval onyx of five layers.

Jupiter, disguised as a Satyr, surprising Antiope. Onyx, two layers.

Dramatic rehearsal ; three youths are chanting from a book, another playing on the double flute, the third beating time. Onyx, three layers.

Centauress suckling her young. Onyx, broken.

Lion seizing a horse. Onyx, two layers.

Horse. Onyx, two layers.

Fragment of a winged Pegasus. Onyx, three layers.

Satyr giving drink to a panther. Onyx, two layers.

Comic mask. Onyx.

Head of Silenus. Sard.

### Intagli.

Head of Hercules, inscribed ΓNAIOC. Beryl.

Head of Medusa, inscribed ΣΟΛΩΝΟC. $1\frac{2}{10}$ in. in length by 1 in. diam. Grey chalcedony.

Mask of Pan, inscribed ΣΚΥΛΑΞ. Amethyst.

Head of Medusa. Sard.

Head of Medusa. Amethyst.

Head of Æsculapius, inscribed ΑΥΛΟΥ. Sard.

Bust of Victory. Sard.

Terpsichore, standing, tuning her lyre, and backed by a cippus supporting a statuette, inscribed ΑΛΛΙΩΝΟC. Nicolo.

Apollo Citharœdus, his right elbow resting on a small draped female figure ; deeply cut on a beautiful hyacinthine garnet.

Achilles, seated in his tent, playing the lyre, inscribed ΠΑΜΦΙΛΟΥ. Sardoine.

Seated Sphinx, scratching her ear with her hind paw, inscribed ΘΑΜΥΡΟΥ. Sard.

Hercules Bibax, inscribed ΑΔΜΩΝ. Golden sard.

Young Faun, front face. Essonite.

Bacchante overpowered by the influence of her god, and attempting to stay herself by catching an amphora. Sard.

Bust of Melpomene, contemplating a mask. Sard.

Dolon grasping the knees of Ulysses whilst Diomede is about to strike off his head, inscribed ΗΕΙΟΥ. Sard.

Mounted hunter, inscribed ΧΡΥCΙC. Sard.

Meleager attacking the Calydonian boar. Banded agate.

Triangular amulet; on one side Eros and Anteros; on the reverse two Sirens, one playing on the lyre, the other on the double flute. Sard.

Horse grazing. Black agate.

Lion looking to the front. Nicolo.

HISTORICAL PORTRAITS IN INTAGLIO.

Perseus, King of Macedon. Lapis-lazuli.

Juba II., King of Mauretania. Sard.

Head, attributed to Jugurtha. Yellow sard.

Head, wrongly ascribed to Rhœmetalkes, King of Pontus, inscribed AMΦO. Black jasper.

Julius Cæsar, full face, inscribed ΔIOΣKOPIΔOΣ. Hyacinthine garnet.

Julius Cæsar. Sardoine.

Livia Augusta, her head veiled, and wheat-crowned as a Ceres ; surrounded by seven groups in relief of objects, the recognized attributes of all the other goddesses. Agate onyx.

Livia, with the attributes of Ceres, in a car drawn by elephants. Yellow sard.

Portraits of Germanicus and Agrippina, held up by a Victory. Onyx.

Galba. Sard.

Vespasian. Sard.

Hadrian. Sard.

Sabina, inscribed ANTIOXIC. Sard.

Heads of Commodus and Hercules. Sard.

Caracalla ; on the reverse Plautilla. Nicolo.

Called Caracalla, but supposed with more probability to be Galerius Maximian ; 2 in. by $1\frac{1}{2}$ in. Onyx, two layers.

Head of Gordian. Sard.

Heads of Carinus and Magnia Urbica. Red jasper.

Silanus and Messalina. Red jasper.

Plato with Psyche-wings attached to his temples, and represented as a terminal bust. Sardoine.

Horace. In the field the letter H. Yellow quartz.

Herodes Atticus. Sard.

Posidonius. Sard.

### Etruscan and Archaic Scarabæi.

Herakles slaying Kyknos, inscribed HEPKΛE KYKNE in Etruscan characters. Burnt sard.

Herakles approaching the warm springs of Himera, indicated by a stream issuing from a lion's mouth. Burnt amethyst.

Herakles seated on the funeral pile. Banded agate.

Kapaneus struck by a thunderbolt, kneeling on one knee; on the back of the Scarabæus, in low relief, a male figure, from whose left arm hangs a vase. Banded agate.

A warrior kneeling, armed with a bow and club; a serpent approaches to bite his foot. This figure has been called Orion. Sard.

Patroklos taking leave of Achilles on going to battle. Sard.

Herakles and Hermes. Sard.

Wounded warrior at the feet of another warrior, imploring his life. Banded agate.

Ulysses, entering his house, is recognized by his dog. Sard.

Apollo holding out a faun. Sard.

Apollo Hyakinthios. Sard.

Hermes kneeling on a tortoise. Sard.

Tantalus trying to drink. Sard.

Danaides carrying water-pitchers. Sard.

Sisyphus. Sard.

Head of the Indian Bacchus. Green jasper.

# DEVONSHIRE GEMS.[1]

Among the most remarkable antique gems in the Devonshire Parure are the following :—

### The Comb.

Head of Leander. Onyx cameo.
Bacchante and Centaur. Onyx cameo.
Bust of King Shahpur. Intaglio. Amethyst.
Faun dancing a young faun. Onyx cameo.

### The Stomacher.

Head of Silenus. Garnet cameo.
Head of Medusa. Hyacinthine garnet. Cameo.
Hercules strangling the giant Antæus. Intaglio. Hyacinthine garnet.
Tiberius, sitting on a throne by the side of a veiled female, presenting a sword to a warrior (Drusus) who stands before him. Onyx cameo.

[1] See Frontispiece.

The Emperor Alexander. Agathe-onyx cameo.
Mars. Lapis-lazuli.
Clotho, the youngest of the three Fates. Onyx cameo.
Ganymede feeding an eagle. Intaglio. Sard.
Head of Cupid. Intaglio. Sard.

### The Bandeau.

Faun crowned with vine. Intaglio. Ruby.
Head of Augustus. Intaglio. Sapphire.
Head of Medusa. Cameo. Emerald.
Diomed stealing the Palladium, inscribed ΔΙΟΣΚΟΥΡΙΔΟΥ. Intaglio. Sard.
Minerva Victrix. Intaglio. Plasma.
Head of Silenus. Cameo. Hyacinthine garnet.
Venus and Cupid. Ruby.

### The Bracelet.

Terpsichore tuning a lyre. Intaglio. Garnet.

### The Necklace.

Dædalus. Intaglio. Sard.
Head of Æsculapius. Intaglio. Garnet.
Julia Sabina, wife of Hadrian. Intaglio. Garnet.
Venus Victrix. Onyx cameo.
The Emperor Tiberius. Onyx cameo.
Head of Mars. Intaglio. Sard.
Head of Apollo. Intaglio. Sard.

### The Diadem.

Head of Socrates. Intaglio. Sard.
Apollo with the lyre. Intaglio. Garnet.
Lion. Cameo. Onyx.
Emperor Commodus. Cameo. Onyx.
A figure in a chariot with two horses.[2] Cameo.
A figure in a chariot with two horses. Cameo onyx.
Dancing figure of a Bacchante. Intaglio. Sard.

### The Coronet.

Bust of Clytia. Cameo. Onyx.
A Dancing Bacchante. Intaglio. Sard.
The Emperor Severus. Cameo. Amethyst.
Head of Hercules. Intaglio. Lapis-lazuli.
Head of Apollo. Intaglio. Amethyst.
Achilles at the tomb of Patroclus. Intaglio. Sard.

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Among those exhibited at the South Kensington Museum, at the Loan Exhibition, 1872, the following are the most remarkable :—

Theseus standing regarding his father's sword. Intaglio. Sard.

Scylla slaying a mariner. Sard.

Achilles Citharœdus, inscribed ΠΑΜΦΙΛΟΥ. Sard.

[2] The ground dark ; one of the horses of a bluish tinge, the other horse brown and white, with the mane blue ; the figure is blue with brown drapery.

Diomede, master of the Palladium, inscribed ΓΝΑΙΟΣ. Banded agate.

Muse seated in a chair, tuning her lyre. Sard.

Tiberius, when young. Sard.

A cow lying down, inscribed ΑΠΟΛΛΟΝΙΔΟΥ. Onyx.

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THE following extract from *The Times*, of Sept. 25, may prove not uninteresting to readers of this Manual:—"A valuable addition has just been made to the collection of gems in the British Museum, through the acquirement by purchase of a splendid specimen of the Zircon or Jacinth. It cost upwards of 700*l*., and is no larger than a common garden pea. It is one of the finest known. It flashes and glows with a red lustre which seems to denote the actual presence of fire and flame." A notice has, however, since appeared in *The Times* to say that the price was not more than 70*l*.

We are in a position to state, on the best authority, that this Jacinth weighs about 3 carats, and cost 12*l*.

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